EDITED BY
H. DAN O'HAIR
MARY JOHN O'HAIR
COMMUNICATING
SCIENCE IN TIMES
OF CRISIS
COVID-19
PANDEMIC
WILEY Blackwell

Communicating Science in Times of Crisis: The COVID-19 Pandemic Volume 1

Communicating Science in Times of Crisis

The COVID-19 Pandemic

Edited by H. Dan O'Hair and Mary John O'Hair
University of Kentucky

WILEY Blackwell

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Part 1

Conceptualizing Communication Science and COVID-19

1

Managing Science Communication in a Pandemic

H. Dan O'Hair and Mary John O'Hair
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In December 2019, events began cascading in Asia that changed the lives of everyone on this planet. The transmission of a virus from a bat to humans (known as *zoonotic*) was little understood at the time, but after only a period of three months, the coronavirus that became known as COVID-19 became the conversation on the tips of tongues of all people. The pushing out of science by medical, technical, even political professionals developed into an onslaught of information that tested most individuals' learning curves.

The study of science communication has taken some important turns in the last 20–30 years. The meteoric spread of infectious diseases; changing conditions in society, in the atmosphere, in our climate; technological advances; and changes in human relationships have offered rich contexts in which to apply communication theory.

> ... disease outbreaks, terrorist acts, and natural disasters are obvious examples of contexts in which risk and health communication play increasingly critical roles. Broadcasting media have found risk and health crisis events to be particularly seductive as stories that fascinate their audiences. Moreover, with digital media evolving at such a rapid rate, many members of the audience have taken on the role of newsmaker or reporter—we are not entirely certain to what effect. Digital media has proven to serve many useful functions such as operating as a conduit for warnings to the public and acting as a gauge for how messages are received and acted upon. On top of these dynamic conditions, many in the science, risk and health communication research communities find extreme events and hazardous contexts to be on the increase, and an evolving media landscape introduces both challenges and opportunities for using communication to manage these situations.
>
> *(O'Hair, 2018, p. 3)*

In this vein, this book will address issues related to the COVID-19 pandemic as well as the research implications intrinsic in the process of communicating science in times of crisis.

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Outstanding Features

This book features chapters that reflect state-of-the art discussion by contributors who propose cutting-edge analysis on the topic of science communication involving extreme events. Authors were commissioned to explore the most salient issues in science communication contexts. Each of the chapters focuses on events and processes facing long into the future. In meeting this challenge, these volumes will feature a line of analysis that connects communication science issues, public policy, education, and the pandemic into a coherent narrative.

The authors created unique perspectives from which to portray these contexts and their accompanying challenges. Each chapter signifies the most up-to-date research in these areas with insightful ideas of where future research and best practices should proceed in the future. Like other recent scholarly books we have published (O'Hair, 2018; O'Hair & O'Hair, 2020), original research findings are offered from ongoing research programs, and in other chapters, unique frameworks and models are presented that unpack constituent elements of complex processes, and "casting them into discernable designs worthy of consideration by researchers, practitioners, and policy makers" (O'Hair, 2018, p. 4). The importance of this work is its ability to bring together the best scholarship in science communication research.

Just as importantly, this book is envisioned to serve as ignition for future work in science communication and to serve as a text for an increasing number of college courses in science communication. It is hoped that this book will nurture additional interest in many types of communication studies and offer connections between communication research and others engaged in science and educational contexts.

Each chapter was commissioned and reviewed with the ensuing guidelines in mind:

- Significant issue/problem?
- Theoretical grounding?
- Recent exemplars included?
- Practical and impactful implications?
- Implications (going forward)?
- New directions offered?
- Unique contribution to science communication research?

Communicating Science in Times of Crisis: COVID-19 Pandemic is intended for multiple audiences, with the primary audiences being those quite familiar to scholarly publishers and academic researchers. The book should attract interest among communication scholars and researchers focusing on science communication. In addition, it is hoped that seminars in science communication, crisis management, policy management, leadership studies, and even medicine will find the book attractive as a primary or secondary text. A third audience is likely to be found in main campus libraries and public libraries as well as libraries situated at health sciences centers. This project follows in the footsteps of other scholarly books, which have become a vital part of the academic and professional contributions of the communication disciplines. The chapters contained herein offer the opportunity to integrate ideas that are on the vanguard of science communication. The chapters throughout the book are organized through four parts: (a) conceptualizing communication

science and COVID-19, (b) promoting health and well-being, (c) advancing models of information and media, (d) and examining policy and leadership. These chapters are employed as part of the overall strategy we lay out in offering an approach for using communication science more effectively during times of crisis, in particular the pandemic of COVID-19.

In the following sections of this chapter, we develop a sketch of three interlocking concepts that facilitate a path for managing the COVID-19 pandemic. We start with a discussion about the essential nature of science communication and the known and unknown complexities of moving science into the public realm where it can be leveraged. In a following section, we confront an inescapable truth of human society—pandemics. It is here that we peel back the veneer of dangerous illnesses that have always confronted our societies and those that in recent times have served as the harbinger of what we confront today and what will likely be in future generations. The section that follows is meant to highlight how communication science can serve as a strategy for mitigating the horrendous effects of COVID-19 and perhaps other viruses confronting us in the future.

The Essential Nature of Science Communication

Conceptualizations of processes termed *science* have been part of our vocabulary for hundreds of years. Science has had an intermittent relationship with the public—sometimes exalted (moon landings polio vaccine, etc.), sometimes suspicious or evil (wartime gases, oversized mistakes like Three Mile Island) and all too frequently those with mixed reviews (vaccines, weight control treatment, etc.). Another way of thinking about science is through considerations of analyses focusing on elements of the scientific process. One of the more abstract but elegant descriptions of science is "a way of knowing" (McComas & Nouri, 2016, p. 560). The processes for generating science are generally thought to include notions that science is not entirely objective, is socially embedded, is empirically based, and cannot answer all questions (Alshamrani, 2008). One generalization that could be made about science is that it has had a long history of advancing the efforts of humans, society, medicine, engineering, and technology. Most of these effects have been heralded by those who understand them and benefitted from them.

It might be useful to conclude this section with broader thoughts about the essential nature of science. Littlefield (this book) advances important arguments supporting the historically close relationship between science and public policy. Examples abound demonstrating how federal policymakers have partnered with scientific organization in order to protect citizens from harm and even develop ways to promote their well-being (Littlefield). The chapter from Childress and Clark (this book) are equally robust in their perspective that science and public policy should enjoy a productive future together. We feel comfortable in borrowing an exemplar quote from the chapter by Ivanov and Parker (this book). The quote comes from Dr. Steven Stack, commissioner of the Kentucky Department for Public Health. Dr. Stack, a scientist, at a public news conference is exhorting the need for science to guide us out of the COVID-19 pandemic:

> One point I want to emphasize is that it's not politics if you have President Trump [Republican] and Governor Beshear [Democrat] making the same recommendations. It's not politics. This is science. If we work together through this, we can succeed.
>
> *(Kentucky.gov, 2020, para. 8, italics added for emphasis)*

What Is Science Without Communication?

> Science Is Not an Alternative Fact!
>
> *(Yard sign during Biden–Trump presidential campaign, 2020)*

Generating good science is a worthy goal among people who want to develop new ideas and processes that are exciting and novel, but the real value lies in science being applied in circumstances or contexts that can elevate conditions and states in the status quo. Science has limited value if it is not used, if it is not communicated to others. Unfortunately, there are too many scientists who feel they are either unskillful at communicating their science to others or believe communicating scientific findings is someone else's job. These are two very serious concerns with the former being a condition of fear of being misunderstood and the latter being a mindset of misplaced responsibility. Regardless of which motivation is at work, science is being marginalized when it is not communicated effectively. We are particularly drawn to a passage in the Hester, Ivanov, and Parker chapter in this book that states "we have a shared responsibility to proliferate, effectively communicate, and disseminate scientific information that reduces risks for the common good of individuals in our families, communities and across the world." If not communicated, is it really science?

A separate issue is one that ascribes further responsibility to scientists in their role as communicators. Freedman and colleagues (2020) contended that scientists need to be mindful about recent interest in scientific work regarding the virus and "use this opportunity to improve scientific communication and transparency as a means to improving our society ... there remains an unmistakable sense that society needs science" (p. 4). Through what communication channel such as television, print, or social media modalities and through which conceptual and political lens a person is focused on are highly influential in how science information is processed. The chapter by Muhamed and Merle (this book) makes clear that situation and contextual properties of scientific messages are influential in portraying scientific information as intended by scientists.

It does not escape us that science can find a way out of the laboratory or field without determined efforts at communication. It is clear, however, that communication done right can move scientific findings into the hospital, office, other labs, and homes at greater speed and with greater confidence and convenience. Quite simply, good science will find an audience, yet that audience will be disappointed, confused, and frustrated without strategic messages that champion, promote, and explain its practical usefulness to the audience. Furthermore, scientific communication is expected to carry essential elements that ensure credibility and durability for the topics it is covering. To wit, messages should contain with them elements necessary to instill the type

of credibility that builds confidence from which people will make appropriate decisions about their health and well-being.

One way of thinking about credibility is through consideration of proven and accepted criteria that build messages, and eventually theories, by which the public readily accepts the assumption being advocated. Chaffee and Berger (1987) offered seven attributers that build "good" communication theory. We think the same principles apply in judging good communication science. These characteristics include the following:

- Explanatory power: The extent to which the science under consideration explains its purpose and to what extent does the explanation extenuate?
- Predictive power: The ability to forecast events or conditions into the future.
- Parsimony: The simplicity of the science. Is it easily described and understood?
- Falsifiability: The ability to test the science.
- Internal consistency: Generally understood as validity. Is the science internally consistent?
- Heuristic provocativeness: Is the science interesting enough to spark new ideas and new testing?
- Organizing power: The ability of the science to make sense or reduce uncertainty for what is known now.

The application of these principles offers the opportunity to judge the ability of messages about science for their worthiness and value. It is because messages come in different forms and through different media that criteria like those above provide scaffolding for improving how science gets in the hands of those who can use it.

Challenges of Science Communication

Notwithstanding our strong stance on communicating science, we are mindful that this process is fraught with obstacles, derisions, diversions, and mistakes. We will explore some of the more obvious challenges of science communication in this section. Issues such as trust, conspiracy theories, misinformation, public confusion, message, and information integrity loom large as obstacles to scientific communication.

A fundamental understanding in the communication process is that some level of trust is shared among those sending and those receiving messages. Trust is sometimes characterized as competence or reducing uncertainty or increasing predictability that helps to establish the legitimacy of science. But what must be understood is that the legitimacy of science is how that relationship between science and the various stakeholders is managed. One way of looking at trust in science is by examining some arguments about public trust in science. Figure 1.1 provides a simplistic view of how science is viewed as a means of instilling trust in the public about science.

Mistrust in the message or the communicator raises serious questions about what to believe and what advice to follow. Mistrust can flow directly from campaigns promoting conspiracy theories that undermine legitimate information from the scientific community (Ivanov & Parker, in book). With increasing exposure to false news, publics are put at greater risk because they are confused or become outright converted to a fake news viewpoint.

Science → → → →Communication→ → → → Public Trust

Figure 1.1 Scientists and science.

Information environments and information ecosystems (Childress & Clark, this book) are terms that provide useful scaffolding for understanding the complexity and relationship among information, messages, and media. Information ecosystems become all the more complex through social media where media users have easy and instant access to serve as receivers of information but also producers, directors, critics, and disruptors of scientific messages. Regardless of motive, participants in the information ecosystem have created a turbulent media environment that is not easily navigated when information is so easily transmitted. As Wright (this book) correctly points out, social media acts as a two-headed coin in the COVID-19 pandemic. On one hand, valuable information is circulated from scientific authorities to help prevent infections, contain the spread of the virus, and track the effects of the disease. The other side of the coin is more problematic in the sense that social media can "contribute to the spread of misinformation and conspiracy theories about COVID-19" (Wright). Another author team from this book (Lillie, Pokharel, Bergstrom, & Jensen) continued the narrative by illuminated how such a "saturated and at times contradictory COVID-19 media environment made communication of scientific and health information challenging" sometimes to a point where media users are susceptible to mental illness complications.

One of the goals of this book is to identify the challenges facing science communicators, but also identifying strategies in service of communication effectiveness. One of the ways of doing so is by bringing together a large and disparate body of knowledge and distilling ideas that can separate fact from fiction. Spitzberg (this book) steps up to the task with two chapters that address the serious need for understanding and addressing the misaligned media behaviors that veer from what is known as truth about COVID-19 science. In one chapter, Spitzberg "calls out" the forms of information distortion such as misinformation, disinformation, conspiracy theories, and fake news and follows up by synthesizing extant literature in the area, and then developing a typology that facilitates better understanding of what he terms "dismisinformation." In another chapter, Spitzberg, Tsou, and Gawron (this book) mined social media messages containing conspiracy-related theories and false information and subsequently conducted geospatial analysis resulting in "a dashboard for near real-time surveillance of social media content related to COVID-19."

Hard data, the lifeblood of communication science, is indispensable to the monitoring and tracking of viruses like COVID-19, and eventually serves a support function in mitigation strategies (as discussed above). The function of data is a primary focus of a chapter by Nowling and Seeger (this book). According to their perspective,

> Data create situational awareness, informs strategic decision, and facilitates public participation in community mitigation strategies. In a more general sense, data addresses one of the most fundamental conditions of the pandemic; high levels of uncertainty about the level of threat and effective responses.

Unfortunately, their own experiences with the virus were troubled by a "lack of resilience and standardization." Nowling and Seeger reported confusion of data collection owing to the sheer scope of the disease and the inconsistency in which public officials perceived the impact of the pandemic. As it turned out, "The lack of accurate data and interpretations informed by science and public health practice may lead to misunderstanding, a reduced ability to manage the event, failures to comply with recommendations and significantly enhanced harm" (Nowling & Seeger). When fundamental issues, albeit critical ones, are compromised such as data collection and monitoring, the entire system of mitigation has much less chance of success. The next section will continue the discussion of data, information, and surveillance from a slightly different focus.

Pandemics: An Inescapable Truth

Disease outbreaks come and go. Outbreaks of coronavirus alone have appeared three times in the last eighteen years. In 2002, Severe Acute Respiratory Syndrome (SARS-CoV) accounted for 744 deaths across 17 countries. Middle East Respiratory Syndrome (MERS-CoV) was first reported in 2012 causing 860 deaths in 21 countries (McLeod, 2020). Of course, there was the Ebola virus with major illness implications appearing in the outbreak of 2014–2016, although it was first discovered in 1976. Numerous outbreaks of bird flu (H5N2) have occurred in several countries, most recently in 2020, and in 2019, swine flu (H1N1) was identified in several countries. At issue is the fact that disease outbreaks can vary a great deal in how they are transmitted and how humans perceive their risks and how they subsequently react to them. COVID-19 is not a disaster simply because it is a pandemic, its widespread destruction is also due to the world's lack of preparation and ill-advised responses to it. Moreover, a keystone of a pandemic is that it is more than a "contagion that is determined by the virulence of organism" (Dasgupta & Crunkhorn, 2020, p. 1), it is spread at various rates depending on the social and behavioral tendencies of human hosts.

How predictable was the outbreak of COVID-19? A number of individuals have strongly suggested that the virus is a *Black Swan* event, an extremely unpredictable incident with catastrophic consequences. As facts have come to light, COVID-19 was anything but a Black Swan, with multiple advanced warnings and predictions offered for something like a virus pandemic of this magnitude. According to the *New York Times*, "Three times over the past four years the US government, across two administrations, had grappled in depth with what a pandemic would look like, identifying likely shortcomings and in some cases recommending specific action" (Sanger et al., 2020). In 2005, Laurie Garrett, a scientific reporter testifying before the US Congress warned that

> "highly virulent, highly transmissible pandemic influenza that circulates the world repeatedly for more than a year" would end up killing more people than all the known weapons of mass destruction "save, perhaps, a thermonuclear exchange"; she observed that "scientists have long forecast the appearance of an influenza virus capable of infecting 40% of the world's human population and killing unimaginable numbers."
>
> *(Renda & Castro, 2020, p. 2)*

More recently in 2020, the television news magazine, *Sixty Minutes* and the *New York Times* reported on a simulation exercise designed and executed by the Trump administration designated with the code name "Crimson Contagion." The exercise was highly complex, involving multiple federal agencies and 12 states simulating the effects of a large pandemic and the United States' capacity to respond to such an event. Results from the simulation were produced in a draft report in October 2019. Crimson Contagion was not released until much later, but many high-ranking officials now had fair warning that an extreme event like a coronavirus would create dire conditions.

Effective surveillance that produces solid and actionable intelligence is key to addressing epidemics or pandemics. A tool that is referred to commonly is the *Global Health Security (GHS)* Index, which is intended to serve as a comprehensive assessment and benchmarking measure of health security and related capabilities across 195 countries. The GHS Index is a project of the Nuclear Threat Initiative and the Johns Hopkins Center for Health Security and was developed with The Economist Intelligence Unit (https://www.ghsindex.org/about). An advisory panel of 21 experts from 13 countries developed the framework that is organized across six categories presented in Table 1.1 below.

According to its sponsors, GHS Index is expected to serve as a crucial monitoring resource and risk assessment tool as extreme events (medical, meteorological/climatological, terroristic, and others) continue to impose their destructive forces on humanity. However, results from assessments around the world were not encouraging as regards pandemic readiness and preparation: "National health security is fundamentally weak around the world. No country is fully prepared for epidemics or pandemics, and every country has important gaps to address" (https://www.ghsindex.org/report-model).

These disappointing trends are reflective of a position taken by one of the author teams in this book. Chen, Li, Ji, Stacks, and Yook argued that "that the pandemic crisis morphed from a 'natural cause' (i.e., an animal virus transferring to a human virus) ... into socio-political, economic, and cultural crises." Their position was that through mistakes and missed opportunities to identify and mitigate vulnerabilities, a medical crisis morphed into something unimaginably more complex. A somewhat similar viewpoint was taken by another chapter in this book where Real, Gregory, Hamilton, and Zborowsky (this book) contended that the US healthcare system, in particular, is ill-equipped to handle extreme events like pandemics based on their short-term view healthcare delivery. Healthcare systems operate from a just-in-time strategy that is

Table 1.1 GHS index.

Prevention: Prevention of the emergence or release of pathogens.
Detection and Reporting: Early detection and reporting for epidemics of potential international concern.
Rapid Response: Rapid response to and mitigation of the spread of an epidemic.
Health System: Sufficient and robust health system to treat the sick and protect health workers.
Compliance with International Norms: Commitments to improving national capacity, financing plans to address gaps, and adhering to global norms.
Risk Environment: Overall risk environment and country vulnerability to biological threats.

more cost-efficient driven under normal operating conditions. When the system becomes stressed, as with epidemic and pandemics, it simply does not have the capacity to withstand the surge of patients.

Getting to the Other Side: Communicating Science to Mitigate COVID-19

The COVID-19 pandemic brought many devastating heartbreaks to people across the globe. Deaths, illness, isolation, loneliness, inconvenience, bankruptcies, unemployment, quashed dreams, and fear of the unknown are just some of the more obvious issues that wreaked havoc with what was supposed to be a year of renewal—2020. At the same time, some extraordinary efforts, events, and collaborations may never have occurred without the presence of the pandemic. This section will discuss some of these special events and other silver linings that are pertinent to science communication.

At the time of this writing (January 2021), COVID-19 remained an unrelenting plague on the world. Voices ringing "this will be over in the summer (2020)" and "this will be just like the normal flu season" were muted and replaced with questions such as "how much longer can this go?", "when will the vaccines fully kick in?", and "will life ever return to normal?" Getting to the other side of the pandemic took longer than most people imagined, even for experts with the most optimistic viewpoints. Digital information management (Renda & Castro, 2020), strategic messaging (Ivanov & Parker, this book), new approaches to audiences (Chen et al., this book) collective efficacy (Hester, Ivanov & Parker, this book), more nuance policymaking (Childress & Clark, this book), and confronting and managing emotions related to the virus (Miller & MA, this book) are some of the strategies that are proposed to improve the chances of shrinking the pandemic to management levels.

Information technology must be included in any strategic plan for mitigating and responding to extreme events such as pandemics. We have discussed previously the largess of social media as a communication phenomenon, and social media will continue to flip that two-sided coin in issues involving controversial issues. Information technology will play a role in communications teleconferencing (such as Zoom), in drone delivery of product and services, and assisting with the diagnosis of viruses (Renda & Castro, 2020). It will take special measures of scientific communication to make possible the diffusions of these technologies on a wider scale.

Ivanov and Parker (this book) identified inoculation messages as potentially powerful strategies for supporting virus mitigation efforts. Specifically, they argued that inoculation messages could serve as methods to counter false information, address and minimize conspiracy theories, and help to resist anti-vaccination viewpoints. The value of inoculation strategies lies in their "potential to effectively counter scientifically-refuted false information (Mayorga et al., 2020). Just as inoculation messages displayed efficacy in neutralizing climate change misinformation (Cook et al., 2017; Van der Linden et al., 2017), this message strategy may hold similar promise in challenging the spread of false coronavirus information" (Ivanov & Parker, this book).

Collective action is not new to the communication landscape, although its potential influence on extreme events such as a pandemic has been understated at times. Hester, Ivanov, and Parker (this book) highlighted collective action as means for sharing

responsibility for problems that are too large and complex for individuals or small groups to confront. In their words, "we have a shared responsibility to proliferate, effectively communicate, and disseminate scientific information that reduces risks for the common good of individuals in our families, communities and across the world." One of the ways Hester et al. suggest for mobilizing collective action is through communicating compassion in science, a unique approach in science communication thinking.

Successful efforts for mitigating the effects of pandemics must take into consideration the policymaking aspect of science communication. In this book, Childress and Clark take on this responsibility and offer a number of insights for how communication, pandemics, and policy can come together to move action forward on mitigation efforts. Childress and Clark make clear that the road to be traveled will not always be smooth:

> Scientific and policy experts face obstacles in getting citizens, leaders, and policymakers to receive and embrace messages about risks and how to respond to them. In our hyper-politicized climate, for example, where everything from donning a face mask to following social distancing guidelines is often viewed through a political lens .... Nonetheless, as public health experts and others endeavor to flatten, and eventually eradicate the coronavirus curve, the strength of analysis, cogency of message, and form of delivery will determine the success in informing, educating, and influencing policymakers and the public.

One of the more controversial issues during the COVID-19 pandemic was K-12 education. Both parents and students grew weary of distance learning, causing great inconvenience for working parents and creating angst for local economies who soon learned the economic impact of open and thriving schools in their communities. A chapter by Bathon and Young (this book) reported data on school officials who related accounts of confronting leadership behaviors in their schools in which they were woefully unprepared to conduct. School superintendents reported that they were out of their element and in effect were facing a "public health crisis, not an education one." In many instances, school leaders were so frustrated with the unfamiliar context they found themselves in, they pled with government officials to just make the decision for them. According to Bathon and Young, "[w]hile school leaders are trained to be good communicators, they were poorly positioned to conduct their own local epidemiological analyses. Unfortunately, the scientific consensus was not arriving quickly enough and the public desire for answers on school reopening plans grew overwhelming, opening the door to political intrusion." Schools did adjust and found some silver linings in the process (enhanced technology for student who had none before the pandemic, enhanced technological skill development among teachers and students, and demonstrable game plans for future "weather days").

Children are not immune to the fallout of a pandemic; even if they are not infected with the virus, they notice events and issues around them. It is not an easy task to ask erstwhile but sometimes piercing questions about circumstances they do not understand. Cook, Sellnow, Sellnow, Parrish, and Soares (this book) reported on a platform they developed to help children understand elements of the pandemic, in particular, those whose role is to help. *Meet the Helpers* is a series of television programs that

teaches children about emergency preparedness and the people who are there to help. Specifically, "Meet the Helpers was created to give public television stations of all types—regardless of news reporting ability—the resources needed to respond in times of crisis and support our youngest viewers. The original project included videos for the following Helpers: Doctor, Meteorologist, Paramedic, 911 Operator, Firefighter, Teacher, and Police Officer." The programming was influenced by the theoretical notion of collective efficacy which when enacted among adults and children alike can have positive effects on children's anti-social behaviors.

Two chapters in the book focused on healthcare and the pandemic. One was authored by Clements-Hickman, Hollan, Drew, Hinton, and Reese and took up the issue of telehealth. With increasing instances of healthcare professionals becoming motivated to reduce their risk of infection, telehealth became a favored choice for delivering care. Most indications are positive for telehealth, and Clements-Hickman et al. feel confident that this form of healthcare delivery is here to stay following the pandemic. Principle among the advantages claimed are convenience, profitability for healthcare professions (fewer no-shows), and clinical benefits. Mental healthcare and educational programming were highlighted as services that are particularly suited for telehealth. The second chapter on health was authored by Real, Gregory, Hamilton, and Zborowsky and centered on the design of healthcare systems. Their chapter describes "how frameworks of hazard control and risk perception can address pandemic responses in the design of healthcare systems ... and how the pandemic has affected typical hospital design, the use of communication technology in this new context, and how communication and evidence-based design (EBD) alter in times of crisis. ... . Evidence-based design is crucial for mitigating infection transmission through purposeful design."

Two other chapters in the book focused on emotions associated with the pandemic or strategies using emotions to lessen the effects of the pandemic. Miller and Ma explored how anxiety can be pronounced following "death thought awareness" brought on by news of the pandemic and how terror management theory can be purposed to manage these anxieties. According to the authors, this approach can be relevant to a number of contexts including interpersonal communication, health communication, and crisis management. The other chapter using emotions as a means for benefiting scientific communication related to the pandemic was authored by Lillie, Pokharel, Bergstrom, and Jensen. They develop a framework entitled, *The Emotion and Critical Reflection Model*, that was emotion-based such that messages can be developed that are emotion-inducing and novel and will trigger critical reflection in people receiving the messages. This critical reflection helps to create a state of contemplation whereby the receiver of the message is in a state of "attitude and behavior change in line with the message."

A Cautionary Tale

We were talking at breakfast one morning in November 2020, and Mary John was ranting about the ridiculousness of the pandemic and it burgeoning so out of control that nothing else was part of our vernacular. We pondered how incredible this would have seemed to us just nine months earlier. We started wondering if even more outlandish

scenarios would have seen more or less plausible—sudden thermonuclear war and insidious interplanetary space invaders were our other two bizarre proposals. We were not entirely sure if the pandemic ranked as a clearer and more predictable calamity than the other two. Perhaps that is the tragedy and paradox of COVID-19—few of us saw it coming in its full fury and relentless persistence. We hope and expect that science communication will be a beacon of light to see us through this pandemic.

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2

Comprehending Covidiocy Communication

Dismisinformation, Conspiracy Theory, and Fake News

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Fake news and conspiracy theories are not new (Baptista & Gradim, 2020; Hofstadter, 1964; McKenzie-McHarg, 2020; Van Heekeren, 2020). For example, the rumors affiliated with the Black Death plague in the mid-1300s falsely scapegoated Jews for poisoning town food, wells, and streams as a cause of the mysterious illness and death. Such rumors meshed well with preexisting prejudices and beliefs (Bangerter et al., 2020; Carmichael, 1998; Finley & Koyama, 2018) and became instrumental in persecution, massacres, and burning of Jews as a result (Cohn, 2007; Porter, 2014; Raspe, 2004). Such rumors originally circulated as collective memories and later became concretized in print media and town records, resulting in selective beliefs being contextually framed by the particular cultural time and place in which they were reconstituted (Carmichael, 1998). While disease outbreaks may serve to unify groups and communities, pandemics such as the Black Death clearly provided convenient and efficient rhetorical tools for the spread of false narratives justifying persecution of groups (Cohn, 2012). Jews, Muslims, China, and other individuals and groups continue to populate the conspiracy theories regarding the COVID-19 crisis (Freeman et al., 2020a; cf., McManus et al., 2020). Clearly, a better understanding of the nature of such forms of disinformation, misinformation, and malinformation can serve to better protect society from such abuses. This chapter seeks to examine the conceptual categories of fake news and conspiracy theory as well as selective theoretical perspectives that elucidate the reasons for their efficacy.

While it seems likely that the mass fabrication of information has existed throughout human history, constrained by the media of the day, what is new to contemporary information diffusion is its ability to ignore the historical friction of distance, and thereby "spread globally at an extraordinary pace" (Alemanno, 2018, p. 1). Fake news and conspiracy theories are born and diffuse rapidly in times of heightened uncertainty, when high quality information is difficult to access, when trust in available sources of information is low (Shahsavari et al., 2020), and when uncertainty, anxiety, threat, or fear are high (Goreis & Voracek, 2019; Leone et al., 2020; Lobato et al., 2014; Madisson, 2014; Moulding et al., 2016; Rommer et al., 2020; Sheares et al., 2020; Swami et al., 2016). Even without the informational stress of fear and uncertainty, evidence generally shows that fake news diffuses faster and farther through social media than reliable forms of news (Sommariva et al., 2018; Vosoughi et al., 2018; Wang et al., 2020). Such

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trends are reinforced by amplifying and accelerating entrepreneurial, institutional, and strategic agendas (Avramov et al., 2020; Caballero, 2020) in which "social networking sites foster the virtual marketplace of misinformation" (Savelli, 2016, p. 24) and "conspiracy brokers" activate the marketplace (Leal, 2020, p. 505) through the form and content of such messages (Baptista & Gradim, 2020; Geschke et al., 2019).

In order to ascertain the extent of the problems presented by fake news, conspiracy theories, and other forms of misinformation and disinformation, it is necessary to traverse a path through many trees in the hope of seeing a full forested landscape. Specifically, with the evolution of the new media landscape, the technologies of deception have evolved in ways that were difficult to achieve in prior eras. As such, some definitional explorations are necessary to specify the nature of such information disorders (UNESCO, 2018).

The Matrix of Dismisinformation

The ever-evolving masspersonal media landscape (O'Sullivan & Carr, 2018) is also still relatively fluid with regard to many of the key concepts and constructs of informational distortion in the digital realm. The term "fake news," for example, is receiving more usage, even if its specific definition may seem elusive and increasingly malleable (Avramov et al., 2020; Leal, 2020). For example, as of this writing, between the years 2010 and 2020, the phrase "fake news" caught up with and rapidly surpassed "pseudoscience" and "conspiracy theory" in usage (Google nGram; see Figure 2.1). It is not clear from such trends what the interrelationship is between these terms, if any.

One of the central elements of most of the concepts discussed thus far is that information or communicated messages intentionally or unintentionally lead consumers of that information to form inaccurate beliefs or perceptions of the world as it actually is. As such, most of the concepts involve some degree of either communication error or deception. For example, Table 2.1 illustrates some concepts related to such communicative distortions. There seems to be more general commonality than differences. Most of the distinctions revolve crucially around the issue of intent or motive: Is the distortion of meaning manipulated for intentional misrepresentation, or is it more

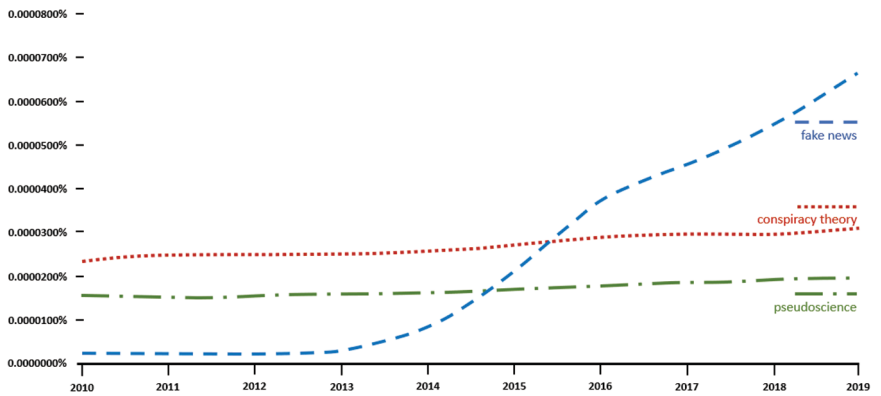

Figure 2.1 Google nGram of pseudoscience, conspiracy theory, and fake news (September 2, 2020, case insensitive, smoothing, adapted).

Table 2.1 Illustrative conceptual definitions of key concepts.

Concept	Illustrative Definitions
Bots	• "automated accounts that use artificial intelligence to steer discussions and promote specific ideas or products on social media such as Twitter and Facebook" (Allem & Ferrara, 2018, p. 1005). • message streams or "accounts that may range from completely automated (i.e. traditional scripted bots) through to hybrid accounts that utilize varying degrees of automation and/or scheduling software, thus producing extremely rapid (1 second or less) coordinated retweet activity" (Graham et al., 2020, p. 17).
Conspiracy theories	• "an unverified claim of conspiracy which is not the most plausible account of an event or situation, and with sensationalistic subject matter or implications. In addition, the claim will typically postulate unusually sinister and competent conspirators. Finally, the claim is based on weak kinds of evidence, and is epistemically self-insulating against disconfirmation" (Brotherton, 2013, p. 9). • "a conspiracy theory can generally be counted as such if it is *an effort to explain some event or practice by reference to the machinations of powerful people, who attempt to conceal their role (at least until their aims are accomplished*)" (Sunstein & Vermeule, 2009, p. 205). • "conspiracy theories are narratives about events or situations, that allege there are secret plans to carry out sinister deeds" (Andrade, 2020, p. 1) or "attempts to explain particular events or situations, as the result of the actions of a small, powerful group, with perverse intentions"(Andrade, 2020, p. 2). • "causal explanations of events or circumstances that posit a powerful group acting in secret for their own benefit and against the common good... they represent one form of misinformation" (Connolly et al., 2019, p. 469). • "attempts to explain the ultimate causes of significant social and political events and circumstances with claims of secret plots by two or more powerful actors" (Douglas et al., 2019, p. 4). • "commonly defined as explanatory beliefs about a group of actors that collude in secret to reach malevolent goal" (van Prooijen & Douglas, 2018, p. 897).
Conspirituality	• a belief system predicated on the integrated assumptions that (1) there is an emerging paradigm shift toward an awakened consciousness in which (2) groups coordinating covert manipulation of social and political order will be revealed and reformed (Asprem & Dyrendal, 2015; Ward & Voas, 2011).
Deception	• "the *deliberate* intention to mislead, without prior notification of the target of the lie" (Ekman & O'Sullivan, 2006, p. 674)
Disinformation	• "intentionally deceptive messages" (Lukito et al., 2020, p. 201); "types of information that one could encounter online that could possibly lead to misperceptions about the actual state of the world" (Tucker et al., 2018, p. 3). "disinformation, which is *deliberately propagated* false information; misinformation, which is false information that may be *unintentionally propagated*; or online propaganda, which is potentially factually correct information, but packaged in a way so as to *disparage opposing viewpoints* (i.e., the point is not so much to present information as it is to rally public support)" (Tucker et al., 2018, p. 3).

(Continued)

Table 2.1 (Continued)

Concept	Illustrative Definitions
	• "used interchangeably with terms like misinformation, propaganda, conspiracy theories, lies, deception, and 'trolling'" (Raderstorf & Camilleri, 2019, p. 5). • "online publications of intentionally or knowingly false statements of facts that are produced to serve strategical purposes and are disseminated for social influence or profit" (Humprecht, 2019, p. 1975).
Fake news	• "fabricated information that mimics the output of the news media in form but not in organizational process or intent" (de Regt et al., 2020, p. 169). • "entirely fabricated stories, most often designed to attract copious views and perhaps to also affect public opinion" (Carlson, 2020, p. 378). • "news emanating from websites that falsely claim to be news organizations while 'publishing' deliberately false stories for the purpose of garnering advertising revenue" (Tucker et al., 2018, p. 3). • "information including 'phony news stories maliciously spread by outlets that mimic legitimate news sources'" (Torres et al., 2018, p. 3977); it is information (transmitting untrue propositions, not considering the cognitive state of the sender) and disinformation (again, transmitting untrue propositions, but now consciously by the sender) (Shin et al., 2018). • "the phenomenon of information exchange between an actor and acted upon that primarily attempts to invalidate generally-accepted conceptions of truth for the purpose of altering established power structures" (Weiss et al., 2020, p. 7). • "a news article or message published and propagated through media, carrying false information regardless of the means and motives behind it" (Sharma et al., 2019, p. 4). • "fabricated information that mimics news media content in form but not in organizational process or intent.... Fake news overlaps with other information disorders, such as misinformation (false or misleading information) and disinformation (false information that is purposely spread to deceive people)" (Lazer et al., 2018, p. 1094). • "the empirically observed problem of the mass distribution of deceptive content across mostly digital media" (Kopp et al., 2018, p. 10). • "information that is inconsistent with factual reality" (Brody & Meier, 2018, p. 2). • "news articles that are intentionally and verifiably false, and could mislead readers" (Allcott & Gentzkow, 2017, p. 213; see also: Bondielli & Marcelloni, 2019; Kim & Dennis, 2019, p. 1026). • "an amalgam of long-standing approaches and strategies taken to delegitimize information itself" (p. 3): It has been examined from various perspectives, including: (1) "Fake news as a result of information overload and 'the principle of least effort;'" (p. 3); (2) "Fake news as a result of poisoned public discourse, logical fallacies and overconfidence" (p. 3); (3) "Fake news as context-independent in a 'post-truth' society" (p. 4); (4) "Fake news as propaganda/disinformation" (p. 5); (5) "Fake news as rumor, misinformation, and conspiracy theory" (p. 5); and (6) "Fake news as parody, satire, and political kayfabe" (p. 6). • "a type of online disinformation, with totally or partially false content, created intentionally to deceive and/or manipulate a specific audience, through a format that imitates a news or report (acquiring credibility), through false information that may or may not be associated with real events, with an opportunistic structure (title, image, content) to attract the readers' attention and to persuade them to believe in falsehood, in order to obtain more clicks and shares, therefore, higher advertising revenue and/or ideological gain" (Baptista & Gradim, 2020, p. 5).
Misinformation	• "false or inaccurate information regardless of intentional authorship" (Southwell et al., 2019, p. 282). • "health-related claim of fact that is currently false due to a lack of scientific evidence" (Chou et al., 2018, p. 2417).
Pseudoscience	• "a reason to regard a theory as pseudoscientific is that it purports to be scientific but has been refused admission to, or excluded from, a research tradition of this kind" (Dawes, 2018, p. 290).

accidental, innocently or sincerely believed by the source of the messages sent (Ekman & O'Sullivan, 2006)? For the sake of simplicity, and with some tongue-in-cheek, the two ends of this intentionality spectrum will be collapsed under an umbrella term of "dismisinformation." The wink-and-a-nod is that such information should be "dismiss-ed" and thus the noun becomes a perlocutionary speech act of sorts. This term has the advantage of being both a simple declarative as well as perlocution—it attempts to describe and persuade at the same time—recognize and then dismiss both disinformation and misinformation.

A formal definition of *dismisinformation* is *any message or set of messages that represent a meaning complex discrepant from or incompatible with a sender's intent and/or a relatively informed or expert consensual evidentiary state*. A meaning complex here represents any individual or normative collective state of belief, value, or attitude and their interrelationships represented as a coherent articulable position, stance, attribution, explanation, or narrative. The phrase of "a sender's intent and/or a relatively informed or expert consensual evidentiary state" refers to at least three potential tests of informational malformation: (1) deception, in the discrepancy between sender's understanding of reality vis-à-vis the signification of the message sent; (2) the discrepancy between the message and majority expert consensus; and (3) the discrepancy between the message and majority expert consensus regarding the state of best evidence. Obviously, any of these may be empirically challenging to establish, and each is potentially fallible. However, given the impossibility of proving the affirmative (i.e., inductive verification), and the possibility of disproving the affirmative (i.e., deductive falsification) (Popper, 1980), each of these tests is at least feasible (Dawes, 2018; cf., Huneman & Vorms, 2018). The function of the term is to pejoratively encompass and advise against the entire spectrum of potentially strategic rhetorical strategies and tactics available for leading information consumers astray from potentially falsifiable evidentiary bases for belief and action, both individually and as a collective polity.

Where formal conceptual definitions find themselves often formulated with the hope that their relevance will be sustained through various technological innovations and evolutionary developments, for the sake of systematic empirical investigations of dismisinformation, a more taxonomic approach may be necessary. There are several taxonomies and typologies relevant to the spectrum of dismisinformation, some of which are reviewed next.

Typologies of Dismisinformation

There have been many expeditions into the task of typologizing forms of both truth (Zimmer et al., 2019) and deception (e.g., Clementson, 2017; de Regt et al., 2020; Garrett et al., 2019; Pawlick et al., 2019), and theorizing their enactments, detection and management (e.g., Buller & Burgoon, 1996; Levine et al., 2016; Walczyk et al., 2014). Hopper and Bell (1984) conceptualized six types of interactional deception: fictions (e.g., make-believe, exaggeration, irony, white lies, etc.), playings (e.g., jokes, teases, kidding, trick, hoax, etc.), lies (e.g., dishonesty, fib, lie, etc.), crimes (e.g., conspiracy, entrapment, counterfeit, forgery, fraud, etc.), masks (inveigling, hypocrisy, back-stabbing, concealment, evasion, etc.), and unlies (e.g., distortions, false implications, misrepresentations). O'Hair and Cody (1994) distinguished five types of deception (i.e., lies, evasions, collusions, concealments, and overstatements), differentiated

across four motive types defined by the dimensions of target (self vs. other) and outcome valence (positive vs. negative): egoism (lying to help self in a benign way), benevolence (lying to help others), exploitation (lying to help self in a way that hurts others), and malevolence (lying to hurt others). Xiao and Benbasat (2011) differentiated three types of deception: concealment, equivocation, and falsification. Curtis and Hart (2020) identified six types, labeled omissions, failed deceptions, half-truths, white lies, distortions, and blatant lies. Levine et al. (2016) proposed 10 pan-cultural motives for deception: personal transgression, economic advantage, non-monetary personal advantage, social-polite, altruistic, self-impression management, malicious, humor-joke, pathological, and avoidance. Bryant (2008) distinguished real lies, white lies, ambiguous gray lies, and justifiable gray lies along the five dimensions of intention, consequences, beneficiary, truthfulness, and acceptability. In conceptualizing the "dark side of information behavior," Stone et al. (2019) differentiated deliberate falsifications, sins of omission, sins of commission, and system or process problems.

Based on Pareto advantage concepts from economics and game theory, Erat and Gneezy (2012) distinguished four types of black and white lies based on the two dimensions of sender advantage or disadvantage and receiver advantage or disadvantage. Pareto improvement refers to situations in which at least one party is better off without making any other party worse off. White lies here are conceptualized as those that increase payoffs for other(s), and black lies are those that decrease the payoffs of the other(s). This approach also informed a lie typology by Cantarero et al. (2018), who differentiated valence (protective/loss-oriented vs. beneficial/gain-oriented lies) by the beneficiary: the liar/self-oriented lies, the liar and others/pareto-oriented lies, or other(s)-oriented lies. Another game-theoretic typology proposed five types of deception models (Kopp et al., 2018), with three forms of channel attack (overt degradation: generate noise; denial: blind/saturate victim; and covert degradation: hide message in noise) and two forms of processing attack (corruption: mimic real message and subversion: subvert processing).

Closer to the construct of fake news, Berduygina et al. (2019) distinguished two types: unintended misinformation and deliberate misinformation. Karlova and Fisher (2013) and Rubin (2019) differentiated misinformation (i.e., inaccurate information) from disinformation (i.e., deceptive information), arguing that "since misinformation may be false, and since disinformation may be true, misinformation and disinformation must be distinct, yet equal subcategories of information" (p. 6). Hastak and Mazis (2011) conceptualized five types of misleading claim: omission of material facts, misleadingness due to semantic confusion, intra-attribute misleadingness, inter-attribute misleadingness, and source-based misleadingness (see Table 2.2).

Scholars are increasingly contemplating the range of dismisinformation in digital polymediated environments. Wardle and Derakhshan (2018; see also: Waldrop, 2017) proposed a tripartite Venn diagram model differentiating misinformation, disinformation, and malinformation (see Figure 2.2). This typology arranges the use of information along a continuum from relatively objective informational distortion or falsity to a more subjective interpretation of intent to harm, rather than intent to deceive.

A few typologies organize mediated deception across two bisecting dimensions. Tandoc et al. (2017) proposed crossing the level of facticity with the intent to deceive, resulting in four quadrants (see Table 2.3). Ferreira et al. (2020) proposed a typology of fake news in branding and marketing based on the dual dimensions of source of

Table 2.2 Truthful but misleading claim typology.

Claim Type	Definition	Claim Subtypes	Examples	Relevant Theories
Omission of material facts	Key fact or facts have been omitted	1. Pure omission 2. Half-truths	1. Failure to disclose gastro-intestinal upset caused by drug 2. "Free" offers do not disclose relevant terms	1. Schema theory 2. Grice's theory of conversational norms
Misleadingness due to semantic confusion	Use of unclear or deliberately confusing language, symbols, or images		"Fresh" product contains artificially processed ingredients	Pragmatic implication
Intra-attribute misleadingness	Claim about an attribute leads to misleading inference about the *same* attribute	1. Attribute uniqueness claims 2. Attribute performance claims	1. "No X" claim meant to imply competitors have X 2. "Contains X" claim meant to imply substantial amount of X	1. Feature-absent inferences 2. Pragmatic implications
Inter-attribute misleadingness	Claim about an attribute leads to misleading inference about *another* attribute		"Low X" claim meant to imply a low amount of an associated Y	Logical or probabilistic tie consistency
Source-based misleadingness	Endorsement by expert or consumer testimonial is biased	1. Expert source 2. Typical source 3. Multiple sources	1. A surgeon endorses a dietary product 2. An extreme weight loss testimonial is not representative 3. Claim "recommended by X% (N) of sources"	1. Source credibility 2. Source homophily 3. Social proof

Source: Hastak and Mazis (2011). © 2011 SAGE Publications.

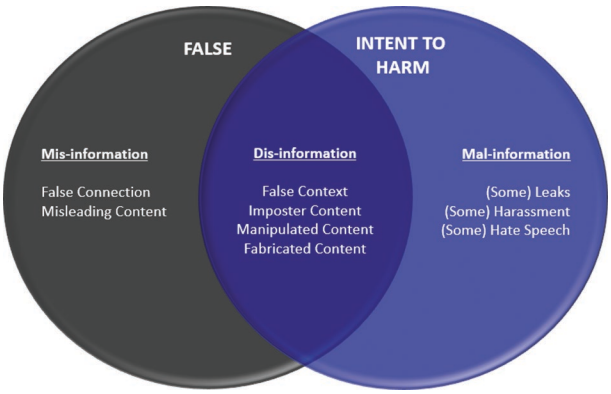

Figure 2.2 Venn diagram typology of Mis-/Dis-/Mal-Information spectrum. *Source*: Adapted from Wardle and Derakhshan (2018) and *First Draft*.

Table 2.3 A typology of fake news definitions.

	Author's Immediate Intention to Deceive	
Level of Facticity	**High**	**Low**
High	Native advertising Propaganda	News satire
Low	Fabrication	News parody

Source: Adapted from Tandoc et al. (2017).

construction and the veridicality with real or fictional events. Internally constructed fake news is generated by a source directly or closely connected to the referent and/or reference of the information, whereas externally constructed fake news is generated by a source that has little or no direct connection with the subject of the news. The result is a quadrant topography (see Figure 2.3). This typology explicitly recognizes the tendency of many forms of fake news to employ frames or contents of valid information as a way of enhancing the appearance of credulity.

UNESCO (2018) adopted a unidimensional spectrum of intent to deceive in differentiating seven types of what they describe as information disorder (see Figure 2.4). This typology was intended to assist in ethical journalism education and practice. As such, it distinguishes both genres (e.g., satire or parody) and various degrees of falsification, largely arrayed by the quantity of fabricated content. UNESCO further differentiated the various dimensions along which information disorders vary (Table 2.4). Some of these dimensions are particularly insightful, such as the recognition of the increasing role of AI and bots in generating false content.

Vraga and Bode (2020) sought to frame misinformation in a context that recognizes the normative nature of truth or reality. Given the philosophical and epistemological challenges of determining a ground state of truth, Vraga and Bode suggested a continuum of how settled and warranted the reality is in its discrepancy from the information provided (see Figure 2.5). They thereby recommend three relative states through which information can progress or shift: from controversial to a more emergent reality

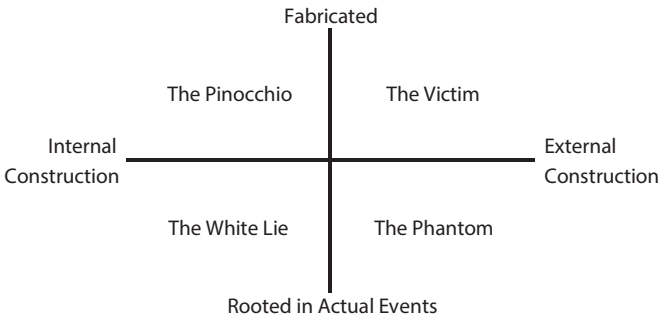

Figure 2.3 Quadrant typology of deception forms. *Source:* Ferreira et al. (2020). © 2020, Emerald Publishing Limited.

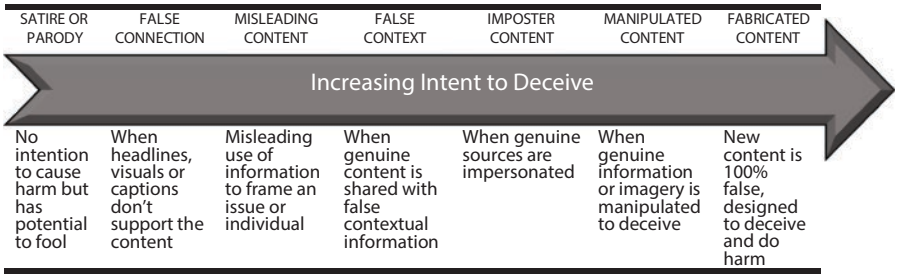
SATIRE OR PARODY
FALSE CONNECTION
MISLEADING CONTENT
FALSE CONTEXT
IMPOSTER CONTENT
MANIPULATED CONTENT
FABRICATED CONTENT
Increasing Intent to Deceive
No intention to cause harm but has potential to fool
When headlines, visuals or captions don't support the content
Misleading use of information to frame an issue or individual
When genuine content is shared with false contextual information
When genuine sources are impersonated
When genuine information or imagery is manipulated to deceive
New content is 100% false, designed to deceive and do harm

Figure 2.4 Deceptive intention spectrum of information distortion. *Source*: Adapted from UNESCO (2018), attributed to firstdraftnews.org.

to more settled truth status. This typology seems well-suited to discussions of the particular forms of dismisinformation of pseudoscience and conspiracy theories.

While most of these typologies of dismisinformation have been deductive in nature, other approaches have been more inductive in development. Kalyanam et al. (2015) used coder annotation and machine learning to automatically classify "credible" and "speculative" tweets regarding the Ebola outbreak. Sell et al. (2020) examined a 1% sample of all tweets between September 30 and October 30 during the 2014 Ebola outbreak, focusing on a random subsample of the 72,775 tweets in English mentioning "Ebola." They coded this tweets subset (N = 3,113) for their veracity (true, false, and partially false) and if their intent was a joke, opinion, or discord. Of the non-joking tweets, 5% contained false information and another 5% contained partially false/misinterpreted information, often consisting of debunked rumors. Importantly, the

Table 2.4 Dimensions of information disorder. Source: Based on UNESCO (2018).

	Dimension	**Exemplars**
Agent	Actor type:	Official/Unofficial
	Level of organization:	None/Loose/Tight/Networked
	Type of motivation:	Financial/Political/Social/Psychological
	Level of automation:	Human/Cyborg/Bot
	Intended audience:	Members/Social Groups/Entire Societies
	Intent to harm:	Yes/No
	Intent to mislead:	Yes/No
Message	Duration:	Long-term/Short-term/Event-based
	Accuracy:	Misleading/Manipulated/Fabricated
	Legality:	Legal/Illegal
	Imposter type:	No/Brand/Individual
	Message target:	Individual/Organization/Social Group/ Entire Society
Interpreter	Message reading:	Hegemonic/Oppositional/Negotiated
	Action taken:	Ignored/Shared in support/Shared in opposition

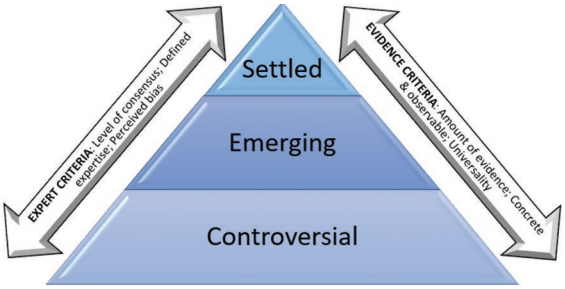
Settled
Emerging
Controversial
EXPERT CRITERIA: Level of consensus; Defined expertise; Perceived bias
EVIDENCE CRITERIA: Amount of evidence; Concrete & observable; Universality

Figure 2.5 Contextual typology of misinformation. *Source:* Adapted from Vraga and Bode (2020).

misinformation tweets were more likely than the true tweets to be discord-inducing (45% vs. 26%), or tweets designed to evoke conflict from other Twitter users. Similarly, Oyeyemi et al. (2014) distinguished "medically correct information," "medical misinformation," and "other" (e.g., spiritual) tweets about Ebola in three countries in west Africa and found that most (55.5%) tweets and retweets contained misinformation, with a potential reach of over 15 million potential readers. Jin et al. (2014) examined 10 common rumors in tweets related to the Ebola outbreak in September through late October 2014 and found that although rumors were common, "they were a small fraction of information propagated on Twitter" (p. 91) and were "more localized, distributed and comparatively smaller in permeation than news stories" (p. 92). Brennen et al. (2020) analyzed 225 pieces of misinformation about COVID-19 from a news fact-checking service, 88% of which were from social media platforms. They distinguished what they referred to as reconfiguration (i.e., "where existing and often true information is spun, twisted, recontextualized, or reworked," which constituted 59% of the instances) from completely fabricated instances, which represented 38% of the information (p. 1). They further distinguished reconfigured information as misleading content (29%), false context (24%), or manipulated content (6%), whereas fabricated content was divided between imposter or impersonation content (8%) and fabricated content (30%). A remaining 3% of the messages represented satire or parody.

Based on over 20 million tweets across over 4 million users commenting on the 2018 state of the union address and 2016 presidential election, Bradshaw et al. (2020) developed an inductively generated typology of fake news based on five a priori criteria: professionalism (i.e., "purposefully refrain from providing clear information about real authors, editors, publishers, and owners, and they do not publish corrections of debunked information," p. 176); counterfeit (i.e., "sources mimic established news reporting by using certain fonts, having branding, and employing content strategies," p. 176); style (i.e., "propaganda techniques to persuade users at an emotional, rather than cognitive, level," p. 177); bias (i.e., "highly biased, ideologically skewed" publishing "opinion pieces as news," p. 177); and credibility (i.e., "report on unsubstantiated claims and rely on conspiratorial and dubious sources," p. 178). The result was a five-category typology of political news (professional news outlets, professional political sources, divisive and conspiracy sources, other political news and information, and

"other"), allowing a direct dichotomous comparison between "professional" news outlets and "divisive and conspiracy sources."

Fake news takes numerous potential forms of misinformation in the transmedia environment (e.g., Tandoc et al., 2017), including "false connection (subtitles that do not correspond to the content), false context, context manipulation, satire or parody (without explicit intentionality), misleading content (misuse of data), deceiving content (use of false sources), and made-up content (with the intention of manipulating public opinion and harming)" (Alzamora & Andrade, 2019, p. 110). Just as importantly, however, are the distinctions between fake news and some of its conceptual cousins that would be excluded from such definitions or operationalizations of fake news. For example, fake news is distinct from (i) unintentional informational mistakes, (ii) rumors that do not derive from news, (iii) conspiracy theories, which are likely to be believed as true by their propagators, (iv) satire not intended to be factual, (v) false statements made by politicians, and (vi) messages intended and framed as opinion pieces or editorials (Allcott & Gentzkow, 2017). Others have attempted to distinguish "serious fabrications," "large scale hoaxes," and "humorous fakes" such as stories in *The Onion* (Bondielli & Marcelloni, 2019). There are, however, gray areas among these. For example, a politician's false statements that are reported without any critical concern for their veracity (i.e., reported as *a priori* factual or potentially factual), or conspiracy theories that contain or rely upon verifiably false claims, may well overlap fake news, especially when news reporting itself gets duped by such false forms of information. Alternatively, conspiracy theories have been typologized by the extent to which they reflect (i) general versus specific content and structure, (ii) scientific versus non-scientific topics, (iii) ideological versus neutral valence, (iv) official versus anti-institutional agendas, and (v) alternative explanations versus denials (Huneman & Vorms, 2018).

Another example of a gray area in such typologies is conspiracy theories that are not disprovable at a given point in time and that may be plausible and feasible yet do not meet professional standards of veracity. For example, rumors regarding COVID-19 that the SARS-CoV-2 virus originated in a laboratory appears to be plausible to approximately a third of the US population, with 23% believing it was engineered, and 6% believing it escaped accidentally from a laboratory and another 25% indicating they are unsure of its origins (Schaeffer, 2020). As these narratives fit with certain political agendas of rhetorical scapegoating, and given that the contrary narrative of natural zoonotic infection (Calisher et al., 2020; CDC, 2019) is merely the relative consensus of scientists, it is difficult to know precisely how to categorize such "news."

Technologically adapted forms of dismisinformation present a complicated category. For example, one "category of social bots includes malicious entities designed specifically with the purpose to harm. These bots mislead, exploit, and manipulate social media discourse with rumors, spam, malware, misinformation, slander, or even just noise" (Ferrara et al., 2016, p. 98). The role of machines (Schefulele & Krause, 2019), bots, algorithms, AI, and "computational propaganda" (Bradshaw & Howard, 2018) increasingly need to be included in typologies of misinformation—the logics may be intentional, but the information itself upon which such logics are applied, may or may not be intentionally fake, or may be intended more to sew chaos or political division rather than mislead per se.

Such malign uses of bots have already begun to be employed for political purposes. A study of tweets about the presidential election in 2016 and the subsequent state of the union address found that almost twice as many polarizing and conspiracy tweets (27.8%) involved amplifier accounts (bots) as professional news outlets (15.5%) (Bradshaw et al., 2020). It is unsurprising, therefore, that bots are beginning to play a role in disease outbreaks and the public response to those outbreaks. For example, bots are often designed with political purpose and intent and algorithmically designed to engage in trend hijacking or a tendency to "ride the wave of popularity of a given topic ... to inject a deliberate message or narrative in order to amplify its visibility" (Ferrara, 2020b, p. 17). In this large social media dataset, bot accounts were substantially more likely to be the carriers of alt-right conspiracy theories compared to human accounts (Ferrara, 2020a).

"Though spam is not always defined as a form of false information, it is somehow similar to the spread of misinformation" that facilitates or promotes "the 'inadvertent sharing' of wrong information when users are not aware of the nature of messages they disseminate" (Al-Rawi et al., 2019, p. 54). Graham et al. (2020) identified a bot cluster of tweets including misinformation and disinformation regarding mortality statistics in Spain and Mexico, many of which contained graphic images of people with body disfigurements and diseases. Yet, there was no immediately discernable malicious intent or objective to the tweet stream. In other instances, the distinction between routine political polarization and identity politics, and disinformation, may be difficult to ascertain. For example, in the Graham et al. (2020) data, one bot cluster of tweets constituted a positive message campaign for the Saudi government and their Crown Prince, along with Islamic religious messages, aphorisms, and memetic entertainment techniques as click-bait. Another bot cluster was more extreme in its partisanship, representing tweets critical of Spain's handling of the epidemic and hyper-partisan criticisms and complaints suggesting the government was fascist. Thus, the role of "intention" becomes problematized in operationalizing fake news, misinformation, and conspiracy theory in software-based mediation contexts.

The importance of this particular form of dismisinformation is suggested by a study of 14 million tweets sent by over 2.4 million users. They found that mentions of CNN were a dominant theme, and there was "not a single positive attribute associated with CNN in the most recurrent hashtags," indicating "that conservative groups that are linked to Trump and his administration have dominated the fake news discourses on Twitter due to their activity and use of bots" (Al-Rawi et al., 2019, p. 66). Another study of 14 million Twitter messages found that "social bots played a disproportionate role in spreading articles from low-credibility sources. Bots amplify such content in the early spreading moments, before an article goes viral. They also target users with many followers through replies and mentions" (Shao et al., 2018, p. 1). Gallotti et al.'s (2020) analysis of 112 million messages across 64 languages about COVID-19 estimated that approximately 40% of the online messages were bots. Another study of 43.3 million English language tweets found that "accounts with the highest bot scores post about 27 times more about COVID-19 than those with the lowest bot scores" (Ferrara, 2020b, p. 8).

Other message clusters may be designated as intentional forms of shaping or reinforcing tactics rather than explicitly false information. For example, some of the Russian Internet Research Agency (IRA, or GRU) campaign was designed to amplify certain stances by increasing the flow of false posts to selected audiences as if they

were from real persons (Lukito et al., 2020; Nimmo et al., 2020), but such efforts can simply machine-replicate *actual persons'* posts with the intent to drown out competing messages or to reinforce or polarize differences in opinions. Such messages might not be explicitly false—they are simply amplified through replication and distribution and then targeted in ways that alter the appearance of the *vox populi*, not unlike traditional forms of mass communication.

Indeed, many of Russia's IRA-generated tweets were able to zoonotically cross the social media—traditional media—barrier and make their way into traditional news media stories. Lukito et al. (2020) identified 314 news stories from 71 of the 117 media outlets searched that quoted tweets generated by the IRA between January 1, 2015 and September 30, 2017. These tweets generally expressed opinions posed as if they derived from everyday American citizens. An exemplar of an opinion tweet was in reference to the Miss USA in 2017: "New #MissUSA says healthcare is a privilege and not a right, and that she's an 'equalist' not a feminist! Beauty and brains. She is amazing!" (Lukito et al., 2020, p. 207). Of those IRA tweets that were primarily informative in nature, "contrary to some popular discourses about the functions and effects of the IRA disinformation operation, the preponderance of IRA tweets drawn on for their informational content (119 of 136 stories, 87.5%) contained information that was factually correct" (Lukito et al., 2020, p. 208). The exemplar was a tweet about how "Security will be dramatically increased at Chicago's gay pride parade" (Lukito et al., 2020, p. 208). In either instance, there is little in the content of the individual tweets that appears insidious or malevolent. However, to the extent they alter the appearance of the actual *vox populi*, they may function to shape the collective discourse and public opinion predicated or reinforced by such perceived norms of opinion and attitude.

A Proposed Typology of Mediated Dismisinformation

A long-standing assumption of communication and rhetorical theory is that "all rhetorical interaction is manipulative in that communicators intend messages and are strategic in their choice of causes, selection of materials, design of compositions, and style of presentation" (Fisher, 1980, p. 125). From such an assumption, and integrating much of the foregoing, a tentative typology of dismisinformation is proposed in Table 2.5. This typology is not likely to properly situate certain forms of online deception beyond the scope of this analysis, such as internet scams (Garrett et al., 2019) or predatory behaviors such as grooming and sexual predation (Black et al., 2015; Burgess & Hartman, 2018; De Santisteban et al., 2018; Dietz, 2018; Gámez-Guadix et al., 2018; Lanning, 2018).

As with several of the other typologies, the key horizontal dimension concerns the motive underlying the dismisinformation, whether relatively innocent or intentionally deceptive and misleading. The vertical dimension, in contrast, refers to the extent to which the message unit under consideration is relatively isolated and discrete (i.e., factoidal), or more fully elaborated in enthymemes, narratives, and theoretical expositions (i.e., narrative/attributional/theoretical). Thus, for example, a simple mistake in a date or location becomes misinformative, but a deepfake meme intending to place a person in a false and incriminating context is more of a form of disinformation. In this typology, the category of fake news becomes distributed and is no longer a distinct category, due to its lack of coherent genetic discernable or codifiable characteristics or

Table 2.5 Dismisinformation typology.

		Unintentionally Communicated and Erroneous	Intentionally (Earnestly, Sincerely) Communicated but Incorrect	Intentional: Exploitative, Deceptive, Malicious, Pecuniary, Identity, Status, Political, Revenge	Intentional: Humorous-Entertainment-Attention-seeking
Motive/Cause					
		Misinformation	Misinformation	Disinformation	Disinformation
Content Form	Factoidal[1]	Factual errors of AI, algorithms, recall, reporting, omission, commission, misinterpretation (e.g., a typo such as: "The incubation period for COVID-19 is 3 weeks" [vs. 2 weeks])	Errors of fact, recall, reporting, omission, commission, misinterpretation (e.g., "The epidemic will disappear once summer comes") (e.g., Orso et al., 2020)	Information designed to mislead in particular action-relevant context (e.g., activist group diffusing on social media that businesses are open by governmental decree on an earlier date than the actual date or deep fake incriminating or mis-contextualized photo)	Information to elicit distraction or entertainment (e.g., memes, puns, punchline jokes, catchphrases, satire, sarcasm, etc.)
	Narrative/Attributional/ Theoretical	Errors of narrative cohesion or attribution (e.g., "The Chinese expelled WHO representatives from their Wuhan lab once they knew they were at fault"; "they" is a misleading referent)	Conspiracy theories (e.g., "I think COVID was the brainstorm of Democrats who wanted to weaken Trump's electoral prospects")	Malign activist conspiracy theorizing or propaganda designed to mislead and establish belief systems contrary to best evidence (e.g., Russian bot farms amplifying misinformation and disinformation narratives to sow confusion and undermine trust in democratic institutions)	Narrative or coherent textual expositions to elicit distraction or entertainment (e.g., full essay parodies, humorous satire; e.g., *The Onion*, *The Colbert Report*)

Note 1: Excusing the adjectival neologism, the intent is to suggest that many forms of misinformation arise as small bits, specific facts or statistics, or simple sentence assertions that often arise from faulty memory, sequential error accumulation (e.g., the Chinese whispers or telephone game), or even mechanical or software reproduction or distortion causes.

features. Instead, fake news becomes more of a rhetorical speech act, related to the tropes of nominal epithet, dysphemism, jeremiad, or diminutive. Nevertheless, as Avramov et al. (2020) argue, despite some key distinguishing features they posit, it is clear that there are "close relationships" (p. 515) and "cross-pollination" (p. 519) between the concepts of fake news and conspiracy theories.

Given this rather variegated landscape of dismisinformation in digital media, the question arises whether such modes of deception and disarray pose a problem for society. Understanding that there are always likely to be political disagreements over methodology and criteria for classifying dismisinformation, to date the research indicates that such viral forms have infected society in several domains particularly relevant to policy and to societal health and welfare.

Theorizing Conspiracy Theory, Fake News, and Dismisinformation

"Uncertainty is a central challenge for public communication on matters pandemic" (Davis, 2019, p. 30). Reducing our uncertainty about our environments is an evolved adaptive capacity (Flack & de Waal, 2007; Kobayashi & Hsu, 2017) for managing real and perceived threats (van Prooijen & Acker, 2015). Conspiracy beliefs provide people with a sense of control over their world (Imhoff & Lamberty, 2018; van Prooijen & Acker, 2015) as well as both a sense of uniqueness (Lantian et al., 2017) relative to the masses and as a sense of belonging with other like-minded persons (van Prooijen, 2016).

A variety of disciplinary (Butter & Knight, 2016; Lazer et al., 2018; van Prooijen & Douglas, 2018) and theoretical perspectives (e.g., affect-based: Zollo et al., 2015; agenda-setting: Limperos & Silberman, 2019; cognitive biases: Brotherton & French, 2015; Douglas et al., 2016; Lantian et al., 2017; frame theory: Franks et al., 2013; gist communication: Reyna, 2020; malign actors: Bradshaw & Howard, 2018; Pomerantsev & Weiss, 2014; Xia et al., 2019; semiotics: Leone et al., 2020; Madisson, 2014), and in particular attribution theory (Clarke, 2002; Spitzberg, 2001), provide a rationale for the role of lay theorizing as a way in which humans manage their uncertainty. Thus, a basic function of conspiracy theories and fake news is likely to be uncertainty reduction in the context of threatening or anxiety-provoking uncertainty. In serving such a function, it has been proposed that "conspiracy theories have deep psychological bases that are present in all human beings" (Andrade, 2020, p. 2). van Prooijen and Douglas (2018) expanded this assumption with four basic principles about conspiracy theories: Conspiracy beliefs are (i) consequential, (ii) universal, (iii) emotional, and (iv) social. To the extent these are taken as given, then an understanding of the varieties and vagaries of dismisinformation is well-warranted.

There are several perspectives toward dismisinformation and conspiratorial thinking (Douglas et al., 2019; Sunstein & Vermeule, 2009; Weiss et al., 2020). Broadly, theories regarding fake news, conspiracy theory, and dismisinformation can focus on any of multiple levels (Giglietto et al., 2019; Sharma et al., 2019), including individual factors such as personality dispositions that promote sharing or belief in such narratives (e.g., Brotherton & French, 2014; Brotherton et al., 2013; Bruder et al., 2013; Douglas &

Sutton, 2011; Douglas et al., 2019; Drinkwater et al., 2020; Enders & Smallpage, 2019; Fasce & Picó, 2019a, 2019b; Goreis & Voracek, 2019; Hart & Graether, 2018; Mercier et al., 2018; Swami et al., 2017; Talwar et al., 2019; Wood, 2017; Zimmer et al., 2019); message factors that focus on affect and negativity (e.g., Porter et al., 2010; Zollo et al., 2015); linguistic, arousal factors or message features, multimodality, repetition, topoi, and tropes that predict virality (e.g., Guadagno et al., 2013; Hameleers et al., 2020; Klein et al., 2019; Pennycook et al., 2018); diffusion dynamics (e.g., Effron & Raj, 2020; Jang et al., 2018; Mahmoud, 2020; Shin et al., 2018; Törnberg, 2018; Vosoughi et al., 2018; Xian et al., 2019; Zannettou et al., 2018); group and social norms influences (Edy & Risley-Baird, 2016a, 2016b; Quinn et al., 2017; Seymour et al., 2015); or more macro societal and cultural factors (e.g., Rampersad & Althiyabi, 2020) or events (Douglas et al., 2019). Some models attempt to integrate factors across these levels (Geschke et al., 2019; Karlova & Fisher, 2013; Leal, 2020; Spitzberg, 2019).

The Evolution of Conspiratorial Thinking

Conspiratorial thinking is a worldview (Brotherton & French, 2015; Uscinski, 2018) found in individuals who are highly suspicious of (epistemic) authority and who believe that "things are not what they seem" (Keeley, 1999). Compared to ordinary narratives, conspiracy theories appear appealing to people who need epistemic (understanding, accuracy, and certainty), existential (control, safety, and security), or social (sense of belonging and social status) comfort and control (Swami et al., 2017). Conspiracy theories typically pose "an allegation regarding the existence of a secret plot between powerful people or organizations to achieve some goal (usually sinister) through systematic deception of the public" (Wood & Douglas, 2015, p. 2). Such narratives provide flexible interpretive frames capable of ongoing evolution and elaboration (Introne et al., 2018).

Conspiracy theorists, who tend to reject that label for self-reference (Butter & Knight, 2016), perhaps in part due to a fear of social stigma (Lantian et al., 2018), tend to subscribe to a conspiracist worldview. Like any worldview, there are meta-narratives that maintain a coherent sense of the (i) nature of reality, (ii) outgroups, (iii) ingroup, and the role of (iv) self and (v) actions on the (vi) future. Dividing the world into an "us" and a "them" (Leone et al., 2020) and "delineating an enemy" are "to a greater or lesser extent, part of every conspiracy theory" (Madisson, 2014, p. 282). The broad epistemic assumption is that some outgroup(s) facilitate systems and narratives that maintain an illusory image of reality to placate a broad passive and exploited public ("sheep"). This outgroup, influenced by some evil elite or cabal, through intermediary management or agents of enforcement, engages in various potential surveillance and control strategies to maintain the powerlessness of the unsuspecting masses (Huneman & Vorms, 2018).

Franks et al. (2017) elaborate these groups in what they theorize is an epistemic and/or spiritual journey involving five stages of evolution. If Stage 0 represents the masses who believe the standard narrative of reality, Stage 1 involves an awakening in which a recognition arises that "something is not in order" in the conventional societal or political orthodoxy (p. 6). Stage 2 involves a dawning realization that "there is more to reality than meets the eye" (p. 6), and that there may be plausible accounts that involve deeper or hidden factors and processes. Stage 3 involves the recognition that "some

official narratives are not true," thereby reinforcing the trajectory from Stage 2 that existing explanations are in some significant way a ruse (p. 8). Stage 4 then generalizes these dual suspicions into a growing confidence, or "default frame of reference, that "all official narratives are illusions" and that "supernormal agency in specific areas is ascribed to normal actors" who are controlling factors responsible for certain affairs (p. 8; see also: Brotherton & French, 2015; Clarke, 2002; Douglas et al., 2016; Sunstein & Vermeule, 2009). This accords with the conjecture that one of the key appeals of conspiracy theories is that humans tend "to think that effects are caused by intentional action, especially by those who stand to benefit" (Sunstein & Vermeule, 2009, p. 208), rather than to believe that many events in life are products of chance, luck or more diffuse or random sets of causes. This is also consistent with standard biases proposed by attribution theory. Stage 5 begins to shift this epistemic frame of reference into a more ontological-symbolic turn in which "all reality is an illusion" (p. 8). In this stage, actors and powers that would ordinarily seem surreal or fantastical instead begin to gain narrative fidelity as potential parsimonious accounts for the aspects of reality that are not right.

Such journeys of exploration and transformation become frameworks for identity development, and thereby become more fully integrated as complex belief and value systems, resistant to subsequent contradiction or reversion to the standard narrative, a "self-sealing quality" of relative immunity to outside rebuttal or counterargument (Sunstein & Vermeule, 2009, p. 207). Such conspiracy theory believers thus become heroic truth seekers, who are more woke and aware than the sheep that populate most of society. The processes involved in this journey in regard to epidemics may also trade in processes of scapegoating and heroization that can be tracked through various media (Atlani-Duault et al., 2020).

Of Narratives, Stories, and Theories

Theories are constituted of metaphors (Hawes, 1975) and narratives (DiMaggio, 1995; Pentland, 1999; Shepherd & Suddaby, 2017), so one tributary of scholarly inquiry and theory needs to understand what makes narratives cognitively and memetically "sticky" (Stano, 2020). Stories and narratives represent one of the fundamental ways in which people make sense of and communicate about policies (Peterson, 2018). The nature of narratives (Corrigan & Denton, 1996), and therefore, conspiracy theories (Gebauer et al., 2016), is to provide descriptive and explanatory arcs of actors and events, which naturally fit into human conceptions of causation (Corrigan & Denton, 1996). "Because of their explanatory power, stories can be linked into cycles to form conspiracy theories, often bringing together normally disparate domains of human interaction into a single, explanatory realm" (Shahsavari et al., 2020, p. 3). For example, a study of anti-vax Instagram posts found that they had greater engagement, more misinformation, and were more likely to involve personal narratives, compared to pro-vax posts (Kearney et al., 2019).

Narratives have the ability to focus and simplify complex policy-relevant information in a way that stimulates and maintains attention (Peterson, 2018). False narratives, therefore, become an attractive strategic tactic for malign or exploitative actors. Conspiracy theories are pervasive in much the same way that many stories and myths are (Leone et al., 2020): "They invoke the same kind of 'whodunnit' questions that are

found in crime fiction and spy novels and incite us to imagine an alternative reality, which is more spectacular, more intriguing, but also more horrifying than the one that we are familiar with" (Bjerg & Presskorn-Thygesen, 2017, p. 138).

Fisher's (1980, 1985a, 1985b) narrative paradigm, which begins with the ontological shift of viewing humans as *homo narrans*, suggests that rhetorical competence consists of the rationality involved in the "mastery of the logic of good reasons," which insures "the minimal, perhaps the optimal, kind of knowledge that must inform the invention, composition, presentation, and criticism of rhetorical messages and interactions" (Fisher, 1980, p. 122). There are two primary criteria of narrative rationality: narrative fidelity (i.e., "the soundness of its reasoning and the value of its values," Fisher, 1985a, pp. 349–350) and narrative probability (i.e., the extent to which "a story coheres or 'hangs together,' whether or not the story is free of contradictions," p. 349). Each of these criteria can be further differentiated (Baesler, 1995). Conspiracy theory and much of the fake news that provide fuel for such theory are rhetorically shaped to appeal to narrative fidelity and probability in the two genres that support such narrative structures: "storytelling and argumentation" (Bangerter et al., 2020, p. 207).

Given a reservoir of cultural stories and mythic narrative structures from which to draw, "conspiracy theorists collaboratively negotiate a single explanatory narrative framework, often composed of a pastiche of smaller narratives, aligning otherwise unaligned domains of human interaction as they develop a totalizing narrative" (Shahsavari et al., 2020, p. 16). These narrativizing predispositions can be illustrated even in early representations of disease outbreaks. For example, in considering the records of the fourteenth-century Black Death pandemic, Carmichael (1998) concluded that "most plague accounts ... impose narrative order on a past plague, assigning its beginning, middle, and end, and selecting which facts and memories are needed to capture the essence or meaning of the plague" (p. 134).

Such narrative configurations or templates are stoked by routine and evolved cognitive biases that enhance narrative fidelity. For example, there is some experimental evidence for a Sarrazin effect, in which the greater the availability or accessibility of extreme or ordinarily implausible explanatory options, the more people tend to move toward conspiratorial accounts (Raab et al., 2013). Another conjecture is that conspiratorial thinking is reinforced by a tendency to seek "us-versus-them" identities (Leone et al., 2020). A third cognitive bias may be the tendency to attribute or seek intention (Brotherton & French, 2015) or agency (Douglas et al., 2016) underlying otherwise potentially accidental or coincidental events, which may also take the form of a tendency of people to presume greater explanatory depth, precision, and coherence than actually exists (Rozenblit & Keil, 2002). There is also evidence for the proportionality bias, which predicts that extreme events cannot be the product of nonextreme causes, and thus, vast disruptive and unusual events stimulate human tendencies to attribute agency, to concoct narratives of actors pulling levers behind the curtain, simply, for example, because "in medical conspiracy theories, unfortunate things (such as, say, the outbreak of some virus) cannot just happen without a purpose" (Andrade, 2020, p. 5). Furthermore, "the more horrendous the consequences of an event, the more brutal and inhuman are those who caused it" (Madisson, 2014, p. 297). In short, narratives with anthropomorphized actors can provide coherence to the unimaginable incomprehensibility of random chance and evolutionary biology.

> An iconic-continuous originator of danger is depicted, to a greater or lesser extent, in all conspiracy theories, ... where it is expressed in approximately this manner: *There must be dark forces behind the catastrophe* or that *there is a terrible conspiracy behind the catastrophe. The enemy* inheres as an essential figure within the very concept of *conspiracy*.
>
> *(Madisson, 2014, pp. 282–283)*

Given that conspiracy theories require an assumption that things are secret or being hidden, it follows that belief in invisible things (e.g., angels, devil, ghosts) is associated with conspiratorial thinking (Goertzel, 1994; Oliver & Wood, 2014). An analysis of mediated beliefs in paranormal phenomena (i.e., ghost stories) suggest the criteria of versatility ("flexibility to represent a cross-section of moods, locations, or themes that span diverse literary genres"), adaptability ("the ability to evolve over time with changes in society"), participatory nature (the facility proffered by the narrative to invite individual and social activity, such as through tours and amateur clubs), universality (of interest to diverse populations, cultures, world views, and belief systems), and scalability ("engage people individually and collectively, via meme-like 'contagious' processes" (Hill et al., 2019, p. 6)). Most conspiracy theories presuppose a non-transparency, such as a cover-up or manipulation of information, which protects the publicity or the official narrative and account of the event, which, of course, implies a group of conspirators who sustain such non-transparency (Raab et al., 2013).

The invisibility underlying conspiracies is also one of the features that makes them resistant to opposing accounts, much less falsification—counterarguments and counterevidence not only do not take into account what is hidden but are misleading products of the cabal that seeks to remain hidden. Of course, Big Pharma has a profit motive to sustain science that supports vaccines, and, of course, China wants everyone to believe the science that 5G will bring only convenience and efficiency to our communications, rather than activating population control through its bioengineered virus. People who only pay attention to "the evidence" are simply not woke to what is happening in secret.

Thus, part of the challenge of identifying and managing conspiracy theories is their paradoxical nature in regard to signification, representation, and rhetorical usage (Madisson, 2014). For example, conspiracy theories represent "a paradoxical duality" in that they are constructed to appear testable like any other set of theoretical hypotheses, yet "on the other hand, the actual usages of the concept of a 'conspiracy theory' often carry the implication that even its possible truth is excluded" (Bjerg & Presskorn-Thygesen, 2017, p. 141)—that is, they claim exemption from direct test or counterfactual falsification by virtue of the conspiratorial influences at work. This is consistent with a common theme that such theories depend on "self-reported access to hidden, secret, or otherwise inaccessible information" (Shahsavari et al., 2020, p. 16). Thus, they appear to claim the traditional narrative as false or deceptive (i.e., "fake"), while simultaneously referring to evidence in support of their claims and excluding the prospect of falsifying their own truth-status. Furthermore, the need to avoid narrative coherence or dissonance, or "the structural breakdown of a given narrative because of emotional, moral, thematic, or conceptual contradictions within the story itself" is defensively employed and deployed as a barrier to incorporating corrective

information (Malena-Chan, 2019, p. 160). Finally, some fake news that is the product of conspiracy theory is generated such that the news shared may itself be valid or factual, and what is fake is the source and intent of the news. For example, some of the Russian Internet Research Agency's information warfare objectives "were to exacerbate division and sow discord among the American public" yet were perpetrated under the guise of a false cultivated persona of an ordinary citizen Jenna Abrams (Xia et al., 2019, p. 1647).

Narrative Theory and Health Communication

The narrative immersion model (Shaffer & Zikmund-Fisher, 2013) extends narrative theory into health communication specifically. It proposes five broad purposes served by narratives: to persuade (e.g., alter behavioral intentions), to influence (alter behaviors), to inform (increase knowledge or decrease uncertainty), to comfort (reduce anxiety) or to engage (transport, immerse, entertain, etc.). These purposes are sought by three types of health-related narrative types: outcome narratives (i.e., the mental or physical health outcomes or effects associated with a health-related factor such as a disease or a treatment), experiential narratives (i.e., the phenomenological symptoms, progression, and senses resulting from a disease or treatment), and process narratives that explain how a person makes decisions relevant to the disease or treatment (Shaffer & Zikmund-Fisher, 2013). The model predicts different effects with different narratives, which would also suggest ways in which narratives could be manipulated to be most relevant at various stages of a disease progression or pandemic history. The model proposes that narrative realism, source credibility (*ethos*), and entertainment value will influence the extent of a person's immersion in a given narrative (Shaffer et al., 2018).

Among the antecedents and consequences of such misinformation is a general distrust of institutions and information sources. In one survey of US adults regarding the 2020 COVID-19 pandemic, 38% believe that government has handled the pandemic issue "badly," 34% are not confident in the health authorities' ability to respond, and 41% report not having enough information on how to respond (Nguyen, 2020). Of over 27,000 readers responding to a Pharmaceutical Technology poll, over half (55%) lacked confidence that the World Health Organization or national healthcare institutions could effectively manage the outbreak (Nawrat, 2020). A Pew survey (Mitchell & Oliphant, 2020) of almost 10,000 US adults in early June 2020 indicated that only two-thirds believed that the Centers for Disease Control and Prevention (CDC) and similar health organizations got their facts about COVID-19 correct "almost all" or "most" of the time, whereas a majority distrusted President Trump and his administration for such information, believing they got such information right only "some of the time" (29%) or "hardly ever" (36%). Trust in government, public authorities, and information sources; worry, fear, and knowledge about the disease; and amount of media exposure and information-seeking behaviors tend to promote compliance with public health recommended infection prevention behaviors (Lin et al., 2014), whereas distrust in government is predictive of belief in conspiracy theories (Freeman et al., 2020a; Imhoff & Lamberty, 2018), which in turn decrease the likelihood of engaging in valid health protective behaviors (Patev et al., 2019). "In polarized, low-trust environments political actors more frequently act as sources of online disinformation. In these countries,

political actors seem to fuel polarized debates by attacking political enemies" (Humprecht, 2019, p. 1984).

Diffusion Theories

Other theories may provide complementary insight into diffusion dynamics of dismisinformation. The multilevel model of meme diffusion (M^3D) proposes that in information-dense ecosystems, any given message or message stream competes in an attention economy at both individual and collective levels (Magarey & Trexler, 2020; Ryan et al., 2020; Spitzberg, 2014, in press; Stano, 2020; Zollo, 2019). In essence, humans are limited information processors facing an information ecology containing an almost infinite amount of information. In contrast to human selection, which by its nature is miserly, media contents, like nature, are profligate. Evidence suggests that people's attention spans are decreasing as their media consumption continues to use more minutes per day of almost everyone's quotidian activities (Spitzberg, 2019; Twenge, Martin et al., 2019; Twenge, Spitzberg et al., 2019). As Simon (1971) proposed axiomatically:

> In an information-rich world, the wealth of information means a dearth of something else: A scarcity of whatever it is that information consumes. What information consumes is rather obvious: It consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.
>
> *(pp. 40–41)*

In such contexts, bright and shiny memes that become viral tend to attract attention and divert attention away from other potentially more important or legitimate sources of information. Indeed, a distinguishing feature of fake news as a rhetorical trope is their imitation and capture "of the time-sensitive media cycle—a daily routine of mass media consumption" (Avramov et al., 2020, p. 517), suggesting there may be prototypical lifecycles to conspiracy theories and fake news (Leal, 2020). Such attention gravity becomes a rather direct threat in pandemic contexts, as herd immunity requires high levels of compliance with health protocols just at the time that people may be most vulnerable to messages promoting noncompliance. Even at liberal estimates of herd immunity for SARS-CoV-2 at 43% of the population (Britton et al., 2020), if over half of the population is commonly exposed to or consumes fake news and/or conspiracy theory messages about the virus (e.g., Freeman et al., 2020a, 2020b; cf. McManus et al., 2020), it can threaten the achievement of such crucial health thresholds. To the extent that "belief in conspiracy theories is demographically mainstream" (Butter & Knight, 2016, p. 6), herd immunity will remain tenuous in its attainability. Ironically, even though conspiracies are likely to fail due to the inability of a critical mass of conspirators to keep such a secret (Grimes, 2016), the critical mass of those who believe such theories tends to make the theories more powerful than their plausibility would imply.

The very format of much of social media can create inattention to specific but relevant content and source information (Baptista & Gradim, 2020; Pearson, 2020). An

analysis of a 10% sample of all global tweets demonstrates the emergence of the word "virus" in tweets in the top 100 ranks across languages during the COVID-19 pandemic, illustrating the competition for attention (Alshaabi et al., 2020). Just as importantly, however, this study also found that "attention across all but 2 of the 24 languages ... dropped through February before resurging in late February and through March" (p. 9), suggesting important time periods in which mass prevention efforts might drop from public focus, which could in turn have significant implications for the resurgence of the disease, recognizable as "abrupt shocks in time series as populations shifted rapidly to heightened levels of awareness" (p. 9). There is also likely to be variegation in the attention paid to certain narratives compared to others. Research on a large sample (2.25 million comments from approximately 130,000 distinct authors) of conspiracy-related posts on Reddit used topic-modeling (Klein et al., 2018). Consistent with other research (Bessi et al., 2015), Klein et al. identified three patterns across a heterogenous set of topics: (i) Some true believers care more about historical events, whereas the other true believers tend to explore more conjectural conspiracies; (ii) some conspiracists focus on only one theory; and (iii) many of those who engage conspiracy theory (arguing for or against) tend to focus on pseudo-scientific topics (e.g., vaccines, chemtrails, etc.). This is important because it suggests that some factions of conspiracy theory and fake news may be more easily targeted by message campaigns and may vary in their attention span for such targeting.

Despite extensive recent interest in theorizing the role of conspiracy theory and fake news in society, it seems clear that "a unified or more cohesive theory" is needed (Weiss et al., 2020, p. 25). There certainly is no single or unified theory at present that is adequate to the need (Huneman & Vorms, 2018), and it seems likely that disciplinary approaches including neurobiology, memetics and communication, psychology, sociology, and big data analytics will serve complementary approaches to understanding the phenomenon (Andrade, 2020, p. 3).

Conclusion

In 2016, Oxford Languages announced "post-truth" as its word-of-the-year. It seems ironic that a typical reader of this statement might doubt the truth that "post-truth" is the word-of-the-year or that a venerated source such as the *Oxford English Dictionary* (*OED*) even makes such pronouncements. How is one to know when anyone can create a webpage anointing a word with such imprimatur? As it turns out, the *OED*'s 2018 word-of-the-year was "toxic," and its 2019 selection was "climate emergency" (Oxford University Press, n.d.). The rationale offered for post-truth, which was an adjective defined as "relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief," was the extent to which post-truth politics had been recently "spiking in frequency" after "simmering for the past decade" (Oxford Languages, 2020).

Increasingly, it seems that "in no other place is instability and post-truth more apparent, than within social media" (Koro-Ljungberg et al., 2019, p. 584). This nascent post-truth *zeitgeist* early in the new millennium has already produced a variegated landscape of signposts, including fake news, fake websites, junk news, deep fakes, trolling, rumor bombs, hoaxes, computational propaganda, pseudoscience, and

high-tech plagiarisms. Some scholars have treated fake news as a rhetorical ploy to create moral panics (e.g., Carlson, 2020). Other scholars celebrate the opportunity for deconstructing traditional "truth regimes" that seem increasingly malleable in their instability (Koro-Ljungberg et al., 2019) in the pursuit of an idealized open society fostered by such theories (Clarke, 2002). Others still might consider such narrative diversity a guard against the hegemonic ideological regime of science (Feyerabend, 1980). Still other scholars view fake news as a sign and vehicle of a new paradigm of post-truth.

> The whole essence of the theory of empiricism, which is anchored on the acquisition of knowledge through the use of human senses has now been challenged with a new reality in which information via enabling technologies can make people see, hear and touch what never existed.
>
> *(Durodolu & Ibenne, 2020, p. 1)*

Certainly, it is reasonable to ask if belief in conspiracy theories serves beneficial functions for their believers (Douglas et al., 2019). Further, in regard to conspiracy theories, history tragically demonstrates that not all conspiracies are false (Pigden, 1995). However, fake news, ironically, is real, as are its consequences. It is not necessary to view it as some seem to, as intrinsically dystopic (Guarda et al., 2018), but its net effects on society need to be considered carefully. The increasing generation of dismisinformation, or "truth decay" (Kavanagh & Rich, 2018), represents a significant threat to open societies, as "it erodes civil discourse; weakens key institutions; and poses economic, diplomatic and cultural costs" (p. ix). "Rumors and conspiracy theories about the pandemic pose a significant threat not only to democratic institutions such as a free, open and trusted press, but also to the physical well-being of the citizenry" (Shahsavari et al., 2020, p. 1). In the context of the COVID-19 pandemic, such dismisinformation poses a threat to life itself (Romer & Jamieson, 2020).

There are glimmers of hope. A global survey by 3M indexes public attitudes toward science. The 2020 survey found a trend of decreasing agreement with the statement "I am skeptical of science" from pre- (35%) to post- (28%) pandemic, and a corresponding increase in trust of science. Scientists are normatively trusted as sources (67% to 84%) compared to friends or family (60%), colleagues (48%), company websites (47%), social media posts (27%), politicians (27%), or celebrities (25%). Much of these trends appears directly attributable to the COVID-19 pandemic. Research indicates that, at least on Facebook, the amount of user interactions with fake news recently decreased, even if such interaction was unchanged on Twitter (Allcott et al., 2019). Such optimism needs to be qualified, however, by the fact that this decrease represented a shift from 160 million engagements per month by the end of 2016 to 60 million, compared to 200–250 million engagements with more traditional news sources (*New York Times*, *Wall Street Journal*, *CNN*, *Fox News*, etc.). Similarly, "on Twitter, shares of false content have been in the 3–5 million per month range since the end of 2016, compared to roughly 20 million per month for the major news sites" (Allcott et al., 2019, p. 4). That is, false information is still engaging tens of millions of people through social media, even after both media platforms instituted various internal algorithmic and surveillance changes intended to contend with such false information.

There is a plenty of space for critical and interpretive theory to contribute to managing such crises. However, implying that there are no immutable truths to such crises is not only untenable but dangerous. Diminution of fake news as mere trope, or celebrations of fake news as evidence of informational pluralism, must be tempered by the actual crises that increasingly threaten the human species, including climate change, despeciation, hunger, and, of course, diseases. Given that malignant actors and information distortion in social media can threaten democratic institutions, norms (Bradshaw & Howard, 2018; Brody & Meier, 2018; Nimmo et al., 2020; Pomerantsev & Weiss, 2014), and reforms (Jolley et al., 2018), disinformation cannot be presumed to produce net benefits in society. Some information can misinform and disinform in ways that exacerbate such crises, and in so doing, directly cause actual forms of cultural and institutional collapse along with widescale morbidity and mortality. There are those who infect media forums with toxicity in ways to disrupt, alienate, or control the narrative (Salminen et al., 2020). "Already we have seen people damage 5G infrastructure, assault people of Asian heritage, deliberately violate public health directives, and ingest home remedies, all in reaction to the various conspiracy theories active in social media and the news" (Shahsavari et al., 2020, p. 17). In the domain of economic systems, "digital misinformation has become so pervasive in online social media that it has been listed by the WEF [World Economic Forum] as one of the main threats to human society" (Del Vicario et al., 2016, p. 558). It may be only slightly ironic that climate change and pandemics are potential existential threats to our species' survival, which makes the dystopic uses of information and communication that propel or sustain such threats their own kind of enabling existential threat.

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3

How Existential Anxiety Shapes Communication in Coping with the Coronavirus Pandemic

A Terror Management Theory Perspective

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Natural disasters, such as earthquakes, tsunamis, hurricanes, tornados, flooding, and draught, happen all too often, as do other man-made crises, such as terrorist attacks, chemical spills, and nuclear meltdowns. In 2020, crises and disasters seem to be the new normal, with monstrous bush fires in Australia; record-shattering forest fires in Western United States; floods in China, Pakistan, and the United Kingdom; and hurricanes and cyclones in the United States, India, Sri Lanka, and Bangladesh.

Topping it all off, the COVID-19 pandemic has wreaked havoc over the entire globe. Since shortly after the first cases were discovered in November 2019 in Hubei province, China, the novel coronavirus outbreak designated COVID-19 has commanded the world's attention. As the pandemic has unfolded, and fear of its spread has come to dominate the global consciousness, along with its propagation, a wave of aggressive behavior, xenophobia, and protests against preventive measures has developed—particularly within the United States—as many have viewed such measures to be oppressively invasive (Escobar, 2020; Manning-Schaffel, 2020; Stewart, 2020). With over 118 million cases worldwide and more than 2.6 million deaths through the second week of March 2021 (CCSE, 2021), medical authorities and researchers observing the unfolding pandemic have noted increasing anxiety and dread about the virus across a range of international populations, exacerbating a number of serious and broadly experienced mental health issues (Li et al., 2020; Torales et al., 2020), particularly in the United States (Czeisler et al., 2020), where more than 20% of the worldwide deaths have occurred.

Arguably, the threat of death from the disastrous events encompassing the pandemic has left an indelible mark on the world's collective psyche that has rendered many of the desperate responses wholly understandable, given how fear of death plays such a central role in human experience (Becker, 1973). Knowledge of the finitude of human existence affects countless aspects of our daily lives, powerfully influencing our communication behavior cognitively, affectively, and motivationally, both within and outside of our conscious focal awareness (Miller & Massey, 2020). To manage the resulting existential anxiety, humans cope and adapt in a wide variety of ways (Menzies & Menzies, 2020; Yalom, 2008); for instance, joining groups, finding consensus in a shared cultural worldview (CWV), bolstering and maintaining a sense of self-worth, and developing and nurturing close relationships (Pyszczynski et al., 2015).

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However, a realization of the inescapable certainty of our inevitable death can also stimulate feelings of desperation, incomprehensibility, meaninglessness, and fear, motivating a broad range of disruptive and maladaptive behaviors, such as blithely attacking outgroup members perceived as different from one's self. At the same time, such feelings can also make us more readily willing to tolerate the moral transgressions of ingroup members felt to be similar (Menzies, 2012; Pyszczynski et al., 2015). Among these behaviors, some clearly relate to our mortal fears, while others seem to have no direct link whatsoever. Given the abstracted nature of this existential dilemma, a number of questions arise: In coping with disastrous events such as the COVID-19 pandemic, how might our fear of death and the disquiet and apprehension it engenders influence our communication behavior in ways we may be unaware of? Do thoughts and reminders of death bring only negative consequences? What can we learn from or about the different coping methods individuals use to buffer the anxiety and fear associated with their mortality? Regarding the current coronavirus pandemic, can different aspects of people's responses to its threat be explained, anticipated, and/or influenced by its death-reminding nature?

From the perspective of terror management theory (TMT; Greenberg et al., 1986), this chapter focuses on how existential anxiety following death thought awareness (DTA) can influence a myriad of communication behavior designed to cope with the fear and dread aroused by the deadly COVID-19 global pandemic. After first briefly introducing the theory, the following sections apply TMT to several aspects relevant to interpersonal, health, and crisis communication. The chapter concludes with a discussion on ways death anxiety may be most effectively managed to help people cope with the COVID-19 pandemic.

Terror Management Theory

In the mid-1980s, unsatisfied with the state of theory explaining several core psychological processes, and curious about the common underpinnings of human motivation, Greenberg et al. (1986) developed TMT as an overarching theory of human motivation. Initially met with a chilly reception, TMT has since provided the explanatory framework for hundreds of empirical studies' testing and sustaining a broad range of novel hypotheses focusing on "why people behave the way they do" (Pyszczynski et al., 2015, p. 3), and the theory has since enjoyed widespread acceptance—albeit with a healthy measure of criticism.

TMT is based on the writings of several existential philosophers and scholars, and most notably the cultural anthropologist, Ernest Becker and his Pulitzer Prize winning work, *The Denial of Death*, published in 1973. As a cultural anthropologist, Becker committed himself to integrating and synthesizing an all-encompassing range of insights and ideas across a broad spectrum of disciplines in an ambitious attempt to comprehend the elemental bases of human nature. According to Becker (1973), the process of human evolution and development has essentially culminated in a collection of meaning making systems—he refers to as culture—designed to provide a symbolic defense against our awareness of the inescapable inevitability of death. Becker (1973) took note of a duality in human life: a physical world and a symbolic world through which humans can transcend their corporeal impermanence by concentrating on the symbolic aspects of their existence.

Deeply rooted in Becker (1973)'s thinking, TMT contends that humans are unique in their development of abstract, symbolic thoughts, and the nature of their self-consciousness. And as with all animals, we humans are driven to maintain the viability of our biologically programmed struggle to survive (Greenberg, Solomon et al., 1992; Solomon et al., 1991). However beneficial our extraordinary human cognitive capabilities may be in helping us to reproduce and adapt to challenges from the physical environment, these same abilities have also forced us to realize the inexorability of our physical death (Menzies & Menzies, 2020). As Yalom (2008) notes, we have come to realize our lives "forever shadowed by the knowledge that we will grow, blossom, and inevitably, diminish and die" (p. 1).

Moreover, the realization of the inevitability of certain death conflicts with our biological striving for immortality, generating the overwhelming potential for debilitating existential dread (Greenberg et al., 1986). Fear of death is so biologically instinctive that even clinical professionals who are often exposed to death-related issues within an intellectually cushioned environment—and thus should be somewhat immunized from the terror of death—are nonetheless wholly vulnerable to the paralyzing existential anxiety thoughts death can so powerfully engender (Arndt et al., 2009).

To manage this existential angst, TMT posits that people instinctively engage in two distinct defense mechanisms: proximal defenses, to deal with the conscious awareness of death, and distal defenses, for when thoughts of death retreat from focal awareness, yet remain primed to quicken existential anxiety (Pyszczynski et al., 1999). Proximal defenses are active, conscious, and galvanized when death thoughts are brought into focal attention, as when, for example, the COVID-19 pandemic is being discussed on TV. During such times, efforts are made to contain or push thoughts of death into the distant future. More specifically, proximal defenses work to manage conscious death thought awareness (DTA) by disengaging from the contemplation of one's mortality so as to remove such thoughts from current concerns (Goldenberg et al., 2000). Furthermore, for this purpose, a variety of communication behaviors are used to achieve the goal of restoring psychological equanimity. For instance, denying one's susceptibility ("I'm too young to suffer a heart attack"), suppressing death thoughts (e.g., by selectively attending to more optimistic outlooks), or taking specific steps to prevent death (e.g., avoiding contamination, and disinfecting all the surfaces in one's house) (Menzies & Menzies, 2020; Pyszczynski et al., 1999).

In contrast, distal defenses are nonconscious and experientially activated when thoughts of death are outside of conscious focal awareness. During distal defenses, people respond to the existential dread generated by DTA by seeking consensus and investing in cultural worldviews (CWVs), self-esteem, and/or close personal relationships that provide meaning in life while serving to buffer the anxiety (Ferraro et al., 2005; Friese & Hofmann, 2008). In this regard, communication plays central roles in all three aspects by helping to define and emphasize group identification, providing social validation, biasing information processing, promoting self-worth, and seeking and developing relational attachments (Miller & Massey, 2020).

Anxiety Buffering Mechanisms

Cultural Worldview. In the face of apprehension and existential unease, CWVs offer normative resources, interpretations, and guidelines helping individuals navigate the

chaotic social world. Adherence to a CWV imbues life with meaning, promotes group coordination, and provides identity security through shared norms and values (Hallowell, 1956). Becker (1973) asserted that one's CWV is "more than merely an outlook on life: it is an immortality formula" (p. 255). In following Becker, TMT defines CWVs as standards for self-esteem that offer individuals avenues for achieving a sense of significance by providing: (i) a view of reality that endows life with purpose, meaning, and importance; (ii) criteria upon which valued human behavior is based and assessed; and (iii) the prospect of immortality, both literal, in some form of afterlife, and metaphorical, in symbolic extensions of the self through creative constructions that persist and survive within culture after one's own physical death.

For those who have faith in and meet the criteria set by their CWV, the shared and strengthened belief systems provide a sense of death-transcendence so long as adherents can preserve and perpetuate them from one generation to the next (Pyszczynski et al., 2015; Schimel et al., 2019). Literal immortality refers to the belief that individuals will still exist after death. It typically takes the form of transcending humans' physical limitations, reflecting the religious aspects of worldviews. However, there is another literal sense in which individuals may experience a form of genomic immortality by sending their genetic material into the future and beyond their own lifetimes. In both cases, whether symbolic or literal, individuals are provided with the means for contributing and extending their quintessence into the future, be it through their works or their progeny, so that traces and reminders of their existence provide something greater than the self, capable of an existence beyond death (Pyszczynski et al., 2015).

Self-esteem. In conjunction with one's CWV, a second, related anxiety buffering mechanism is provided by one's sense of self-esteem, which TMT defines as being derived from a personal evaluation of the extent to which one fulfills expectations prescribed by the CWV to which one subscribes. The link between CWV and self-esteem becomes instilled during childhood, when at an early age we see ourselves as wholly dependent on our parents for nurturance and security, and it is only later that we develop our own sense of agency along with an ego that allows us to consider the past and the future (Erikson, 1959). It is our growing self-awareness and realization of future uncertainties that groom our unique capacity for DTA, and fear of our own helplessness in the face of both real and imagined threats. Our resulting human proneness to existential anxiety is only ameliorated once we begin to develop a sense of autonomy and eventually a sense of confidence in our self-determination and self-efficacy, which, along with our successful interdependence and social interaction, serves as the basis for our development of self-esteem and self-worth.

Moreover, both parental nurturing and disapproval during the socialization process function to transform the child from an impulsive hedonist to a self-regulated individual in search of self-esteem. As Rothschild et al. (2019) explain, "Disapproval does not just make the child feel as if they have done something wrong, but is actually anxiety provoking in an existential sense. So 'good' versus 'bad' becomes internalized and conditioned to be the equivalent of 'safety' versus 'threat'" (p. 181). Thus, self-esteem development during childhood is critical for the transition from pleasing one's parents to living up to the dictates of one's CWV and enjoying the security and meaning it provides. As Rothchild et al. put it, "there is a shift over childhood from deriving safety and security from the love of the parents to deriving it from the love and protection of

more powerful entities such as deities, authority figures, the nation, and culturally valued ideas and causes" (2019, p. 181).

As TMT posits, self-esteem serves to buffer existential anxiety in response to DTA by allowing individuals to see themselves as valuable members of their culture, thus worthy and capable of being remembered and esteemed by others beyond their death (Greenberg, 2012). Moreover, relative to finding consensus in and/or adhering to one's CWV, TMT studies have provided empirical validation for how bolstering self-esteem tends to afford an even more effective buffer against existential anxiety when thoughts of death are aroused. When mortality is made salient in response to the coronavirus pandemic, those high in self-esteem are more likely to rely on their sense of self-worth to manage the resulting existential dread, whereas those low in self-esteem are more likely to find comfort in the equanimity provided by their CWV. Unfortunately, this may take the form of hostility toward dissimilar others, outgroup derogation, and intolerance for those who do not share their own CWV (Das et al., 2009).

Close Personal Relationships. A number of TMT studies have shown how, under certain circumstances, close personal relationships may be even more effective in buffering existential anxiety than both self-esteem and CWV bolstering (Florian et al., 2002). From the perspective of attachment theory (Bowlby, 1973), securely attached individuals are at an advantage in developing a sense of self-worth and viewing the world as a safe, meaningful, and caring place. Given how close personal relationships can provide much of the consensual validation needed for assuring individuals that they matter to others, they may serve as an especially vital foundation for developing one's anxiety-buffering capacities, and this utility should be especially valuable when facing daily reminders of the mortal threat posed by the SARS-CoV-2 virus.

On the other hand, insecurely attached individuals who may be anxious, apprehensive, hesitant, or avoidant in forming and maintaining close emotional bonds with others may find it particularly difficult to form self-validating attachments useful in developing the senses of meaning and mattering necessary for transcending the physical self. Thus, when their mortality is made salient, a failure to form or maintain strong bonds and the consequent anxiety buffering protection they afford makes those who are insecure in their attachments particularly vulnerable to the existential anxiety. As a result, when attempting to cope, they may have only their CWV or self-esteem on which to lean (Mikulincer, 2019).

Empirical Support

Since its debut in 1986, hundreds of studies conducted in diverse cultures around the world have supported hypotheses derived from TMT. A common feature of these studies is the mortality salience (MS) manipulation used to induce DTA. Typically, participants in the experimental condition are prompted to experientially process the prospect of death by writing about how the thought of their own death makes them feel, and what it would be like during the process of physically dying. Following such a task, and before DTA can be assessed, one or more cognitive distractions are typically used to help participants move from proximal to distal defense. In contrast, those in the control condition are reminded of other topics unrelated to death, such as dental pain, music, or test taking. Repeatedly, these studies have replicated and confirmed the effects of MS, that is, death reminders induce individuals to eagerly invest in the

integrity of their CWV, the viability of their sense of self-esteem, and the strength and sustainability of their close personal relationships (Florian et al., 2002; Helzer & Pizarro, 2011).

Strengthening One's CWV. In examining the nature of CWV bolstering, Landau et al. (2004) explored the effects of DTA and thoughts of the 9/11 terrorist attacks on the popularity of the incumbent American president George W. Bush, who, as head of state and commander in chief of the US military, represented a symbolically vital component of the dominant American CWV. Weeks before the 9/11 attacks, several national public opinion polls (e.g., *CNN*/*Gallup Polls*/*Fox News*) showed a roughly 50% approval rating for President Bush; however, just two days after the attack, that approval rating had surged to 90% (Zogby, 2004), where it remained for several months. The public reported high support for the measures implemented by the Bush government to handle the terrorist attack, including the military operation against the Taliban regime, the suspension of certain civil liberties, and the initiation of the war in Iraq (Huddy et al., 2002; Toner & Elder, 2001).

As TMT posits, the perception of strength projected by government leaders can help citizens manage the existential anxiety generated by their fear of death and uncertainty, thus the popularity of President Bush stemmed from the sense of protection he provided through the tough measures he implemented against those deemed (if not actually) responsible for the terrorist attacks. Across four studies, Landau et al. (2004) found both MS and terrorism salience produced greater support for President Bush at the expense of his rival candidate Senator John Kerry.

Boosting Self-esteem. Research examining the anxiety buffering function of self-esteem has demonstrated how defensive reactions to threats can be regulated and modified by experimentally manipulating participants' self-esteem before inducing DTA. For example, Harmon-Jones et al. (1997) found boosting self-esteem by providing positive personality feedback can decrease defensive reactions to mortality threats. Conversely, Hayes et al. (2008) found that experimentally threatening self-esteem can increase the accessibility of death thoughts. In general, when self-esteem is low, individuals tend to be more prone to feeling vulnerable and anxious in response to threats and more reluctant to engage in self-related thoughts (Wisman et al., 2015), while at the same time relatively more inclined toward ethnocentrism (Agroskin & Jonas, 2013) and dissociation toward outgroup members (Greenberg et al., 1997). Reiss and Jonas (2019) have noted how low self-esteem inclines individuals toward feeling less vital and active, less motivated to engage in exploratory behavior, and less satisfied with life, which they experience as less meaningful (Routledge et al., 2010). In contrast, individuals high in self-esteem, though they may also quite naturally show negative responses to threats, tend to react with increased willingness to confront those threats, even to the point of joining the military and making personal sacrifices for their country (Juhl & Routledge, 2014).

In summary, in response to existential threats, as Reiss and Jonas (2019) conclude, whereas low self-esteem is generally associated with more passive defensive reactions, high self-esteem tends to motivate greater agentic involvement and more proactive defensive responses. However, the latter may often be a mixed blessing, given how, "individuals high in self-esteem are more inclined to prove their belongingness to a cultural worldview," while, in the case of nationalist zeal, "these responses can also be very detrimental for peaceful solutions to intergroup conflicts" (p. 461).

Investing in Close Personal Relationships. The anxiety buffering utility of intimate relationships is also well documented in the TMT literature. For instance, across three studies, Florian et al. (2002) demonstrated the dynamic interaction between relational processes and psychological defenses. Specifically, close relationships inoculate existential threats; the perception of commitment in relationships is shaped by the need to suppress DTA; and the process of managing existential terror facilitates committing to close relationships. Florian and colleagues found that: (i) DTA results in higher reports of romantic commitment (Study 1); (ii) the salience of romantic commitment thoughts mitigates the influence of DTA on evaluations of social transgressions (Study 2); and (iii) the salience of thoughts about difficulties in romantic relationships makes death-related thoughts more salient than do thoughts about other non-relationship issues (Study 3). Along similar lines, Cox and Arndt (2012) reported like findings in their experiments demonstrating how people will rely on close relationships to reduce existential anxiety following MS, such that people will: (i) exaggerate the extent to which their significant others see them in a positive light (Study 1 & 2); (ii) show higher commitment to their significant others under the condition of DTA (Study 3); and (iii) reduce DTA in response to MS when perceived positive regard from significant others is made salient (Study 4).

However, not all people are capable of calling on the utility of their close relationships to cope with DTA. According to the attachment styles characterizing individuals' relationships, they will respond differently when dealing with the existential anxiety during distal TM defense. As attachment research has demonstrated, those who are secure in their attachments tend to be more comfortable with closeness, more confident in others' availability when needed, and have a more positive history of attachment than those who are either anxious in their desire to be enmeshed in their relationships, or those who tend to be avoidant in their attachments. Studies allying attachment style with distal TM defenses have shown attachment style to be closely linked to anxiety buffering distress regulation following MS: Securely attached individuals tend to be comfortable seeking support from their close relationships (Mikulincer et al., 1993), whereas those with anxious attachment are more inclined to focus on distress-related cues, and those with avoidant styles more likely to eschew close proximity with their partners, preferring to rely on themselves and therefore unable to benefit from the coping utility of their close relationships (Mikulincer & Florian, 1998).

The TMT literature examining attachment has evidenced the efficient regulating role of attachment style in managing the existential dread engendered by the fear of death. For instance, secure people have indicated a higher sense of lastingness (Florian & Mikulincer, 1998) than anxious and avoidant people and have reported themselves to be less fearful of death (Mikulincer et al., 1990). Moreover, Mikulincer and Florian (2000) found anxious and avoidant people reported higher severity judgements of transgressions in response to death reminders than secure people who showed more desire for intimacy. Florian and Mikulincer (1998) assert that secure people thus find it easier to build an adequate protective shield for managing death anxiety, whereas anxious people tend to experience overwhelming fear, and avoidant people are more inclined toward suppressing their dread. Their findings indicate anxious and avoidant attachment styles render individuals more susceptible to disquiet and apprehension when their mortality is made salient, and thus they must tend to rely more on CWV defense and/or self-esteem bolstering to buffer their anxiety.

Applications of TMT

From a communication perspective, TMT offers explanations and predictions applicable to media use; international relations; social influence; political, intercultural, and interethnic interaction; health and risk communication; and interpersonal connections related to how people manage existential anxiety. Accordingly, the theory provides valuable suggestions for effectively coping with a broad range of problematic situations (e.g., natural disasters, terrorist attacks, disease pandemics, etc.) that tend to make mortality salient for human beings, some of which will be addressed in the following sections, particularly as they relate to the COVID-19 pandemic.

Death Anxiety and Dissociative Communication

TMT has been widely used to explain and understand dissociative communication behaviors, such as intergroup conflicts, discrimination and prejudice toward dissimilar others, low tolerance for moral transgressors, and political conservatism in the aftermath of disastrous events (Greenberg & Kosloff, 2008; Landau et al., 2004), both natural (e.g., floods, hurricanes, tornados, and forest fires) and man-made (e.g., terrorist attacks, chemical spills, industrial calamities, and pandemics). As TMT posits, in such situations, people are reminded of the tenuous vulnerability of their existence, and the resulting DTA generates and intensifies existential anxiety to the point where it motivates them to increase their investment in the anxiety buffering mechanisms available to them.

To achieve both literal (in the genomic sense) and symbolic immortality, individuals need to be faithful to their CWVs and meet the standards of values specified therein. However, due to their vast capacity for misunderstanding the nature of reality, along with the scarcity of objective criteria available for determining whether and to what extent they are living up to the standards set by their CWV, individuals need consensual justifications of their CWV from others, as well as the means for avoiding any disconfirmations (Pyszczynski et al., 2015). Validations from others increase the legitimacy and certainty of one's worldview, whereas disconfirmations produce the opposite effect.

In response to existential anxiety, reinforcing the notion that "we are good, and they are evil" both increases positive responses toward ingroup members with whom individuals share worldviews and gain confirmation and simultaneously intensifies negative responses toward outgroup members, thereby avoiding worldview disconfirmation (Greenberg & Arndt, 2011). Moreover, in response to DTA, individuals tend to overstate the importance of others sharing their CWV and understate the importance of those with whom they differ. To the extent that disconfirmation from others should produce the aspersion of those holding dissimilar worldviews, Becker (1971) asserted that even the mere presence of differing worldviews can be perceived as threatening, thus justifying their derogation. In this sense, MS should motivate people to contrive more dissociative behaviors (e.g., bias, prejudice, and discrimination) and disconfirming responses when interacting with differing others, but perform more associative behavior (e.g., cooperation and agreement) and confirming responses when interacting with similar others. Judging by the antagonistic and polarizing narratives ideological differences

have produced as the virus has spread within the United States, such dissociative behaviors seem to be emblematic of the strife and divisiveness surrounding the pandemic's development, which have severely hindered efforts to contain it.

Moreover, numerous findings within the TMT literature provide support for the expectation that the discord and divisiveness from clashing worldviews is likely to continue. For instance, MS has been found to increase outgroup discrimination (Burke et al., 2010), lead whites to be more favorable toward white pride advocates (Greenberg et al., 2001), increase preference for products from one's own country over those from foreign countries (Jonas et al., 2005), make people more aggressive against people who criticize one's country (McGregor et al., 1998), invoke more negative stereotypes toward people of different races (Schimel et al., 1999), and make people less tolerant of those different from themselves (Yum & Schenck-Hamlin, 2005). Beyond laboratory studies, real-world observation has further confirmed the influence of MS on ingroup favoritism and outgroup derogation (Keil & Ali, 2006; Landau et al., 2004; Tavernise & Oppel, 2020).

A similar form of worldview reinforcement was in evidence during the 2003 SARS outbreak, when, after interviewing Canadians from mainland China and Canadian-born citizens with Chinese backgrounds, Goossen et al. (2004) found respondents reporting markedly increased racism toward them during the crisis. This racial hostility took on various manifestations, ranging from alienation and discrimination to harassment and outright violence. The authors further noted how the SARS outbreak was referred to by many as the "Chinese disease," and how this racism-infected speech and related behavior was spread globally in tandem with the pandemic. Keil and Ali (2006) also warned, during the SARS outbreak in Toronto, marginalization and discrimination against Asian Torontonians was demonstrated and heightened by images of "exotic" animals in "wet markets" in southern China, to the extent that the Torontonian ideal of multiculturalism and anti-racism was overpowered by the propagation of such anti-Asian images.

Many other dissociative communication behaviors have been noted in response to the existential anxiety experienced following MS. As posited by TMT, these hostile and intolerant behaviors have been observed even when the ideological extremity of the actions involved goes against the overall collective identity expressed by the dominant worldview within the culture (Hirschberger & Ein-Dor, 2006). However, despite extensive empirical support demonstrating the occurrence of such antagonistic behaviors in response to existential anxiety following DTA (Kosloff et al., 2006; Routledge et al., 2010), studies have also produced findings in which these effects are absent, wherein MS actually produces greater levels of commiserative and sympathetic behaviors relative to control conditions (Perach & Wisman, 2019).

Moreover, a number of TMT studies have found encountering dissimilar others may, under certain conditions, lead to more associative behaviors (Greenberg, Simon et al., 1992; see Miller & Massey, 2020 for a review). For instance, when the concept of tolerance was highly valued and accessible, Greenberg, Simon et al. (1992) found no difference between MS and control conditions when participants judged a target individual who criticized America. When the concept was made salient, the researchers found those for whom diversity was an important aspect of their CWV were more tolerant of dissimilar others following MS, whereas those for whom it was not an important aspect showed less tolerance.

Perach and Wisman's (2019) review showed how creativity can have a small to medium effect on buffering existential anxiety. In other words, more positive outcomes are likely to occur when one's CWV is cultivated in a way that places high value on openness and flexibility. Miller and Massey (2020) also note that when elements such as tolerance and equality constitute the core values of one's CWV, individuals will show less dissociative behavior in the service of worldview defense, because tolerating dissimilarities and valuing equality play an important role in self-validation. Together, these studies suggest that when certain, specific, positive CWV components such as creativity, open-mindedness, tolerance of differences, compassion, and similarities among positive human traits are cultivated and/or made salient, MS can lead to less dissociative—and in many instances—even more associative communication behaviors (Greenberg & Arndt, 2011; Lykins et al., 2007; Vail III et al., 2019).

Adaptive vs. Maladaptive Coping During the COVID-19 Pandemic

In addition to the tendency to display dissociative vs. associative communication behavior when encountering dissimilar vs. similar others, individuals are often inclined to exhibit maladaptive vs. adaptive communication behavior concerning health issues. As it relates to the COVID-19 pandemic, this could involve rejecting sound health information, derogating authoritative medical sources, and avoiding healthy actions and practices (Blondé & Girandola, 2019; Claudy et al., 2011; Ma et al., 2020). Considering the potentially risky human activities individuals may engage in within the midst of a pandemic, when informed of the costs and benefits of various behaviors, whether the negative consequences of maladaptive behavior (e.g., venturing into public without a protective face mask), or the positive consequences of prosocial behavior (e.g., practicing social distancing), defensive responses toward the information (e.g., psychological reactance) should be expected (Blondé & Girandola, 2019; Ma et al., 2020).

In many cases, despite favorable attitudes toward the information, there may nonetheless be an inconsistency between the relevant attitudes and the behaviors observed. Many health communication studies have demonstrated the relatively small, or even negative effects of information on stimulating productive behavior change, even though participants report positive attitudes toward the health-relevant information and/or high intentions to perform the advocated behavior (Claudy et al., 2011; Grandpre et al., 2003; Miller et al., 2013). From the perspective of TMT, a defensive response in the form of information rejection may often constitute a type of proximal defense aimed at forestalling the advent of existential anxiety (Pyszczynski et al., 1999). As TMT posits, in terms of CWV bolstering and ingroup tolerance, individuals may also respond positively when death thoughts are in focal awareness. Therefore, the observed positive responses in studies (e.g., positive attitudes and/or high intentions to behave as recommended) likely represent proximal defenses aimed at shielding the physical self from DTA. However, to buffer their existential anxiety as thoughts of death move out of focal awareness, where they are less consciously accessible, people will tend to engage in more negative, discordant CWV bolstering behaviors associated with distal terror management defenses.

Fortunately, as Goldenberg and Arndt (2008) and Greenberg and Arndt (2011) have shown, such undesirable distal defenses may be moderated or eliminated by cultivating a worldview where health promotion and prosocial behavior are highly valued. When promoting healthful, socially beneficial behavior constitutes a core component of one's CWV, efforts toward worldview defense function to reinforce adaptive behavior and reduce negative outcomes. Along similar lines, finding pathways to self-esteem associated with adaptive behavior in response to DTA associated with the COVID-19 pandemic can also serve to maximize positive outcomes, encourage greater engagement in health-promoting social behavior, and foster a healthier, socially harmonious lifestyle. As Yum and Schenck-Hamlin (2005) found, two weeks after the 9/11 terrorist attacks, there was an upsurge in altruistic activities, with many people reporting that they were spending more time involved in interpersonal conversations regarding the wellbeing of their neighbors, and in community conscious behaviors in general. During the coronavirus pandemic, when chances for effective interpersonal connections with others is limited by quarantining and the need for social distance, seeking interpersonal connections through online social support groups and/or via social media interaction may help people relieve stress, reduce anxiety, and help individuals maintain overall mental health (Ma & Miller, 2020).

These and other related studies within the TMT literature (Hirschberger et al., 2008; Van Tongeren et al., 2013; Wade-Benzoni, 2006) demonstrate a "silver lining" that can often offset the increased existential anxiety that follows in the wake of traumatic events. In line with much of the social support literature (Moscardino et al., 2010; Mossakowski & Zhang, 2014; Pow et al., 2017) when it comes to building resilience and facilitating recovery from disastrous events, these findings provide valuable implications for ameliorating potential mental health issues following crises, disasters, and traumas. As research in disaster and crisis management has shown, mental health concerns such as post-disaster trauma, functional impairment, and socioemotional stress often occur in the aftermath of crises, affecting many aspects of communal wellbeing, and social and individual development (Beaton et al., 2009; Kaniasty, 2020). Moreover, as mentioned above, in conjunction with CWV and self-esteem bolstering, investing in close personal relationships can also serve as an especially effective means of restoring and maintaining social and psychological equanimity.

Death Anxiety and COVID-19

Psychological mechanisms for providing socioemotional equanimity are especially important during the calamity caused by a major pandemic, when, given the need for physical isolation and social distancing, people are likely to be under greater stress while at the same time enjoying comparatively fewer chances to socialize or seek communal support. With the initiation and cultivation of personal relationships becoming more difficult to effect and maintain, their utility as efficient buffers against existential anxiety is greatly diminished right when they are needed the most—in response to the high levels of uncertainty, insecurity, and dread produced by the ongoing pandemic made salient by continuing coverage in the news. Moreover, the intense coverage of the spread of COVID-19, and the thousands of confirmed cases and mortalities announced each day is making the prospect of death ubiquitously and unavoidably salient on an international scale.

From an evolutionary perspective, threats of pathogens and diseases may stimulate existential anxiety since they are likely to prompt thoughts of mortality in opposition to the fundamental motive—self-preservation. Consequently, when faced with the specter of death made salient on a continuing basis by the coronavirus pandemic, TMT predicts individuals will turn to the utility of their CWV, self-esteem, and, when available, their close personal relationships to buffer the resulting anxiety. Indeed, extant research has shown how thinking about a virus outbreak—such as the Ebola epidemic (Arrowood et al., 2017) or the H1N1 pandemic (Bélanger et al., 2013)—has the same effect as a standard MS prime operationalized in the lab. In both cases, death thoughts become highly accessible, stimulating proximal and distal defensive behaviors that may often end in outgroup derogation, intolerance, and hostility toward dissimilar others.

Given the highly polarized nature of the political landscape in place even before the coronavirus pandemic began taking thousands of lives within the United States, TMT provides a clear explanation for much of the intolerance, hostility, political grandstanding, scapegoating, dissimilation, and deception engaged in by many political leaders, including the president of the United States, who has contributed to the problem by exacerbating an ongoing "infodemic" (WHO, 2020). Moreover, the coronavirus infodemic functions to further magnify the destructiveness of the COVID-19 pandemic by disseminating erroneous information giving rise to misunderstandings, interpretative mistakes, medically unsound and inaccurate statements, proliferation of supper spreader events (Aschwanden, 2020), fake news, conspiracy theories, and even antisemitism and racism, among other deleterious outcomes (Evanega et al., 2020; WHO, 2020). President Donald Trump, who was recently empirically demonstrated to be the single leading driver of misinformation about the COVID-19 pandemic (Evanega et al., 2020), has not only been accused of failing to contain the spread of the novel coronavirus but also of hampering efforts to curtail the deadly nature of the pandemic by actively playing a major role as a key "amplifier" (WHO, 2020), hindering efforts to deploy the best means of preventing its spread and continued destructiveness.

As Landau et al. (2004) and other TMT researchers have demonstrated, rather than a more rational consideration of the governance and leadership qualities possessed by political leaders, the public's attraction to them is largely a function of the emotional and symbolic protection afforded by how such leaders are perceived. As it relates to the coronavirus pandemic, TMT research has shown how everyday stimuli, such as newspapers, television news, and social media can adversely affect people's social interactions and negatively bias a range of outcome responses (Das et al., 2009; Landau et al., 2004; Massey & Johnson, 2018). Considering the recent widening in the polarization of ideological assumptions and practices associated with quarantining, mask-wearing, and social distancing, it should be no surprise how more negative outgroup perceptions, source credibility assessments, and personal and public health behaviors have come to aggravate and stymie efforts to contain and eliminate the spread of COVID-19.

As dozens of TMT studies have shown, elevated DTA motivates biased processing, such that, although people may show increased favoritism and tolerance toward those providing consensus for their own worldview, individuals will correspondingly exhibit greater hostility toward those threatening or merely holding a different worldview.

What's more, beyond attempting to derogate competing worldviews, such as can be observed when competing ideological positions encourage opposing responses to the coronavirus pandemic, anyone attempting to proclaim or publicize a compelling alternative approach to confronting the pandemic can not only undermine the legitimacy one's own responses to the threat, but also, according to TMT, threaten one's own overarching belief system, the basis of which acts as a vital buffer against the anxiety generated by death thoughts made salient by the pandemic.

As TMT posits, in such cases—when one's own CWV is threatened by the mere existence of a competing CWV—individuals may often be motivated to engage in a defensive strategy called "threat accommodation" (Schimel et al., 2019), which involves keeping faith in one's core worldview (e.g., the United States is powerful in spite of the "China virus") but selectively modifying its peripheral aspects (e.g., by implicitly taking solace in the fact that Chinese health authorities have greatly reduced the spread of COVID-19 within China), so as to include otherwise-threatening ideas (i.e., the Chinese health officials' responses to SARS-CoV-2 have been superior to our own) as a part of one's own CWV (i.e., however, our medical science is the best in the world).

Another form of threat accommodation involves attempting to assimilate nonbelievers into one's own worldview (Schimel et al., 2019), as for example often occurs via social media activity, as friends try to convert each other to their own way of thinking by exchanging friendly and helpful posts for others to learn about their own beliefs, or by showing how other intelligent and attractive people have been convinced to see the light. Social media may also have a significant impact on people's risk perceptions and willingness to contribute to their friends' awareness (Han & Xu, 2020). In this regard, MS can lead people to bypass the need to derogate dissimilar others in favor of simply attempting to convert the nonbeliever, thereby turning an otherwise worldview-threatening social interaction into a form of self-validation (Kosloff et al., 2017).

Although assimilation may be preferable to derogation, when rumors, gossip, and unreliable information are spread readily via the internet through social media, the propagation of diverse and contradictory views promoted by questionable web-based "experts" can produce confusion, anxiety, and panic that may further exacerbate pandemic spread, whether they are honest mistakes or intentional (Pazzanese, 2020). False or misleading information is dangerous, and it can cause widespread public reluctance to adopt well-founded infection control measures promoted by bonified medical authorities, and it can seriously delay the implementation of essential health interventions (WHO, 2018). Moreover, misinformation spread by government leaders may be even more harmful when it is disseminated over social media, for instance, when Facebook and Twitter posts include videos of President Trump expressing scorn for wearing masks and social distancing by willfully convening large, maskless, and crowded rallies (Baker, 2020; Egan, 2020), or by mocking his political opponent for so often wearing a mask (Mackey, 2020).

A TMT perspective also helps to explain how a political leader can continue to enjoy a devoted partisan following even in the face of an obvious failure to contain or curtail a crisis situation, or even in light of convincing evidence of the leader's role in effectively intensifying the crisis. In the case of the coronavirus pandemic, as polls show, there is a clear relationship between people's approval/disapproval of President Trump's handling of the pandemic and their decisions to decline or choose mask

wearing, social distancing, or seek a vaccination against the coronavirus. Ironically, this may perhaps not be such a bad thing, given how faith in the federal government to provide accurate information about the pandemic—and particularly trust in the White House, and Donald Trump in this regard—is at an all-time low, with more than two-thirds of Americans placing little or no confidence in the Trump Administration (Jackson & Newall, 2020).

Beyond those who were directly affected by a recent supper spreader event that took place in the White House Rose Garden (Buchanan et al., 2020)—likely including the President himself, along with at least seven other high ranking officials and lawmakers (Gringlas, 2020)—the spectacle of hundreds of unmasked people sitting shoulder to shoulder in the Rose Garden exhibiting a willful dismissal of precautions illustrates the failure of the White Hours to set an example useful in lowering the proliferation of COVID-19 (Fisher et al., 2020). The vehement rejection of the President's policies and actions by his political opponents is only rivaled by the seeming blanket acceptance shown by his own party, which illustrates the polarizing nature of worldview bolstering and bashing predicted by TMT in response to the anxiety intensifying effects of colliding ideologies and conflicting worldviews.

In this regard, it is unsurprising to see both covert and overt racism toward Asians and Asian Americans. Since the first case of COVID-19 was discovered in China, xenophobia, discrimination, and verbal and physical attacks against Asians have intensified worldwide, and especially within the United States, as the pandemic has lengthened (Human Rights Watch, 2020) and President Trump has taken to referring to SARS-CoV-2 as "the China virus" (Yeung et al., 2020). Moreover, these observations, readily visible to lay observers, have been confirmed by empirical evidence. For example, Golec de Zavala et al. (2020) examined attitudes toward violations of traditional Polish norms in sexual and gender relations during the COVID-19 pandemic, collecting data both before and during the pandemic. Analyzing it via latent growth curve modeling, they found a linear increase in desires for national unity, authoritarianism, and rejection of sexual dissenters as the pandemic unfolded.

Along similar lines, Arrowood et al. (2017) found that reminding people of the Ebola epidemic (caused by a viral disease with a more deadly but lower infection rate than COVID-19) made death thoughts more accessible than the control condition and increased participants' need for worldview defense. Similar studies examining responses to the Ebola epidemic have found DTA associated with reminders of the epidemic to increase political conservatism (Beall et al., 2016) and generate greater prejudice toward the gay community within the United States (Inbar et al., 2016). Likewise, Song et al. (2020) hypothesized that informational conformity in consumer behavior—which is formed on the basis of a desire to accurately interpret reality, and thus correctly behave—should buffer anxiety when mortality is made salient. Investigating the relationship among DTA, need to belong, informational conformity, and consumer behavior during the COVID-19 pandemic, Song et al. (2020) found DTA positively related to both the need to belong and informational conformity, which in turn influenced their consumer behavior. These findings are consistent with the TMT assertion that existential anxiety promotes the protection of traditional worldviews, while simultaneously stimulating the rejection of moral transgressors (Pyszczynski et al., 2015), and further illustrates how thinking about the coronavirus pandemic can initiate these biasing processes, resulting in actual behavioral outcomes.

Despite the existential threats involved, and likely because of the elevated levels of existential anxiety, there have been numerous emotionally volatile protests against official government directives in several countries around the globe, including the United Kingdom, United States, and Brazil (Fonseca & McGeever, 2020; Picheta, 2020; RNZ, 2020). Because these three countries in particular lean toward the individualistic end on the individualism-collectivism spectrum (Hofstede Insights, 2020), their populations tend to place relatively greater emphasis on personal freedoms; thus, when their governments issue official guidelines, such as practicing social distancing and wearing masks to slow the spread of the virus during the pandemic, a portion of their populations' protestors are likely to feel that such directives and preventive guidelines impinge on their freedoms.

From the standpoint of TMT, the importance of self-determination and individual freedom, and the consequent motivation to safeguard such rights and values can function as the basis for sustaining the integrity of one's CWV, and thus an important form of distal defense capable of maintaining an effective shield against existential anxiety. Because the ongoing coverage of the COVID-19 pandemic is prone to provoking a stronger need for the anxiety buffering function of ones CWV, TMT would predict greater emphasis will be placed on individual freedoms, resulting in more intense objections to any preventive measures seen as hindering or violating them. On the other hand, more collectivist countries, such as China, South Korea, and Taiwan with cultural orientations inclined toward relatively greater interdependent interaction, should be more likely to welcome and eagerly adopt preventive measures such as social distancing and mask-wearing. Such behaviors should be seen as instantiating rather than violating important communal values; thus, complying with relevant government directives would demonstrate adherence to the dictates of one's CWV, thereby strengthen the effectiveness of its anxiety buffering function.

Depending on the salient aspects of one's CWV, either dissociative behaviors such as defiance, discrimination, and racism may be brought to the fore by the presence of divisive rhetoric in the news or more associative behaviors may be encouraged, such as promoting the socially beneficial aspects of preventative measures. Indeed, many simple, useful, and preventative behaviors are greatly on the rise (e.g., the use of hand sanitizer; Hiebert, 2020), which makes perfect sense in light of how they can function both as proximal defenses useful in fighting the virus and the physical threat it represents, and as distal defenses useful in dealing with the existential anxiety and psychological threat presented by the pandemic.

Given how proximal defenses are moderated by perceptions of their effectiveness at decreasing the threat of death and distal defenses are moderated by CWVs and self-esteem (Goldenberg & Arndt, 2008; Greenberg & Arndt, 2011), efforts can be made, respectively, to achieve greater compliance with preventive measures; promote more protective behaviors; and reduce intolerance, bigotry, and violence during calamitous events such as the COVID-19 pandemic. First, in terms of increasing successful proximal defenses, effective measures should be provided along with psychologically artful rhetoric and effective messaging capable of increasing public perceptions of the efficacy of preventive measures, as well as encouraging the receptivity of promotional messages.

Second, considering the importance and significance of the worldview validating role played by respected cultural role models, communicating the risks of COVID-19 and of the efficacy of available preventive actions by such admired people should be

shaped in ways that help individuals cultivate a sense of adherence to the higher order values within their CWV. By engaging in and demonstrating preventative actions for the sake of the many as well as the individual, leaders, dignitaries, celebrities, and other admired notables can aid in normalizing such actions, helping to render them as common values, central to cultural norms.

As an effective means for slowing the spread of viruses, vaccines have played a fundamental role in controlling and eradicating diseases for decades, yet their acceptance is far from universal. Promoting vaccination not only as a critically important defense against pandemic spread, but also as a significant value central to the dominant CWV is another vital area in need of attention. At the present moment (March, 2021), scores of promising vaccines have been developed and undergone advanced human trials, with several now available and already in wide distribution (Pfizer-BioNTech; Moderna; and Johnson & Johnson) and two more in large-scale Phase-3 clinical trials (AstraZenica and Novavax), likely soon to be released (CDC, 2021). Yet, as dozens of polls indicate, there is both a national and a global hesitancy in accepting vaccination as a common preventative measure (Reynolds, 2020). Even among otherwise well-educated populations, "vaccine hesitancy" (Dubé et al., 2013) is a persistent problem for a number of reasons lacking in scientific merit, including a range of religious beliefs, superstitions, motives for indecision, and other correspondingly irrational beliefs (Bedford et al., 2018; Warner et al., 2017). Thus, countering such beliefs, and further, replacing them with more valid understandings central to a sound, well-founded, and scientific worldview should be a major goal of governments, public health authorities, educators, and concerned citizens worldwide.

Of more immediate concern, as it applies to the coronavirus pandemic, it is estimated that developing antibodies in at least 60%–70% of the population is necessary for achieving herd immunity (DeMarco, 2020); therefore, concerted efforts to attain high vaccination rates are imperative. From the standpoint of TMT, vaccine promotion by all elements of society—at the national, state, and local community levels—is critical for emphasizing the efficacy of COVID-19 vaccines, not only for immediate purposes of controlling the pandemic during proximal defense against mortal threats, but at the distal level as well, where self-esteem, interpersonal relationships, and meaningful aspects of CWV all play vital roles in ameliorating existential anxiety within the complex process of terror management defense.

Conclusion

The dilemma we humans find ourselves in is as obvious as it is intractable. Our remarkably impressive cognitive capacities have endowed us with the ability to reflect upon the past introspectively, experience the present in all its intensity, and contemplate the infinite. Yet, as we learn, grow, and survive, we are faced with the fragility of our existence and constantly reminded of the inevitability of our mortality and the inescapable certitude of our eventual death. Over millions of years of evolution, our species has been phylogenetically prepared and ontogenetically motivated to strive for immortality. It is the conflict between our striving for the infinite and our comprehension of the finitude of our existence that generates the potential for crushing anxiety at the prospect of ultimate demise. As TMT research has affirmed, thoughts about death frequently menace us with trepidation and threaten our equanimity on an almost daily

basis. Consequently, when death thoughts become accessible, we are motivated to reduce the resulting existential anxiety via a range of conscious and nonconscious defenses. More than 35 years of empirical observation has confirmed the validity of TMT as an explanatory framework for predicting a very broad range of motivation-based phenomena, including intergroup conflict, ethnic strife, racism, derogation of dissimilar others, dogmatism, intolerance for ambiguity, and all manner of violent behaviors that some have characterized as the essence of evil (Greenberg & Kosloff, 2008; Jost et al., 2003; Lifshin et al., 2017).

On the other hand, hundreds of experimental studies applying TMT have also documented a vast array of positive motivation-based phenomena predicted by the theory as well, including the unstinting investment so many humans are willing to make in efforts to strengthen and secure their close personal relations (Florian et al., 2002), as well as improve and enhance their physical and mental health (Goldenberg & Arndt, 2008). According to TMT, these efforts toward bodily and emotional strength are associated with a number of other positive and transformative paths in life, including community involvement and the building of supportive connections (Arndt et al., 2002), the fostering of creative and open-minded behaviors (Routledge et al., 2004), the instantiation and maintenance of positive values and beliefs (Crocker & Wolfe, 2001; Vess & Arndt, 2008), and the prioritizing of positive growth-oriented goals (Vail et al., 2012). These studies, and other similar explorations, provide important implications for health communication scholars considering many of the central variables involved in our efforts to cope with and survive cataclysmic events such as the COVID-19 pandemic.

Of particular value and use when attempting to handle the daunting challenges posed by a global pandemic is a form of reciprocal altruism that, under the right conditions, can develop and blossom in response to crisis. Hirschberger et al. (2008) have shown how MS can foster the development of peaceful, healthy, and charitable communities when the prosocial causes pursued promote terror management defensive processes by helping individuals establish a belief in their own worth as a valued member of a group, playing a meaningful role in response to the needs of other group members. In so doing, the individual contributes to the community in worthwhile ways that reinforce a social contract that further ensures all community members can be relied upon to help one another. In this way, as Hirschberger et al. (2008) note, such reciprocal altruism indirectly promotes the individual's own personal safety along with that of the community, while also boosting self-esteem, solidifying personal bonds, and instantiating the highest values central to a vibrant and stable CWV. Through the strengthening of all three of these psychological mechanisms, the latent but incessant threat of existential anxiety experienced during a global pandemic may be alleviated.

Granted, humans are naturally inclined to favor ingroups over outgroups relations (Tajfel, 1970); however, TMT offers some promising pathways for reducing the incidence and negative consequences of outgroup discrimination and dissociative behavior. Perhaps, foremost among these paths, research has shown how cultivating and elevating noble values and principles such as tolerance, empathy, compassion, openness, and creativity can be conducive to overcoming the rigid application of outgroup bias prompted by the existential dread following from the contemplation of death. Greenberg, Simon et al. (1992) have demonstrated how tolerance and egalitarianism can be encouraged and even maximized following DTA, as long as these two key

values are primed before mortality is made salient. In a similar way, other values central to the highest principles of our CWV—freedom, equality, fairness, liberty, and justice—might also be primed within our collective consciousness during times of crisis, thereby fortifying the values and concepts embodying the most transcendent aspects of our CWV, and thereby brought to bear on how we choose to engage in our anxiety buffering efforts.

Finally, the calm assurance of our close, personal relationships functions as perhaps the most effective shield against existential anxiety, offering us a form of genomic immortality by sending our genetic material into the future. As a buffer against existential anxiety, our close personal relationships may be even more psychologically reassuring than the symbolic immortality offered by our CWV (Miller & Massey, 2019). Thus, developing more secure and deeper bonds may greatly reduce our reliance on self-serving, culturally "received" (as opposed to personally "authentic") forms of coping, thereby obviating the need for many destructive, dissociative behaviors and biases.

A terror management perspective on meaning and growth may also provide many rich and effective ways for overcoming the tendency to behave in maladaptive ways, while adopting more growth-oriented paths toward a healthy and meaningful life (Rogers et al., 2019). Despite all the negative consequences the experience of existential anxiety may bring in the wake of the COVID-19 pandemic, there may nonetheless be a silver lining at the end of this ordeal. As Rogers et al. (2019) suggest, reflecting upon our mortality in ways that purposefully illuminate the greater aspects of our individual nature can shift our focus toward the pursuit of more intrinsically (as opposed to extrinsically) rewarding goals, while promoting more prosocial actions, intentions, and behaviors. Although an unconscious focus on death can create anxiety and dread, a more conscious contemplative view of one's mortal nature can relate positively to feelings of authenticity and worth and help to instill a stronger desire to live in greater health and harmony with those around us.

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Part 2

Promoting Health and Well-being

4

Communication and COVID-19

Challenges in Evidence-based Healthcare Design

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Coronavirus disease 2019 (COVID-19) is a novel respiratory illness that can easily spread from person to person (Centers for Disease Control [CDC], 2020a). Approximately 364,000 deaths in the United States were attributed to this virus between mid-February and early January 2021 and nearly 1.9 million deaths worldwide (CNN, 2021). Because of its novelty, less people have immunity and thus many require healthcare and hospitalization (Fauci et al., 2020). There are many reports of dangers to caregivers in healthcare facilities (CDC, 2020b). Healthcare in the United States is delivered in complex systems governed by many different jurisdictions, including the CDC, Federal Emergency Management Agency (FEMA), Occupational Safety and Health Administration (OSHA), and World Health Organization (WHO), as well as state, county, and other localities. Understanding the role of healthcare design in mitigating the COVID-19 pandemic provides an opportunity for recognizing how communication and physical layout are important factors in times of crisis.

Both communication and design can play a role in protecting patients, families, providers, staff, and the community against infectious disease in a pandemic. New designs can be developed to reduce the transmission of pathogens in healthcare facilities. Tailored messages can be delivered to promote safety and wellness behaviors as well as guide patients and provider interactions. Frameworks for knowledge and safety risk can inform the response. Staff well-being is crucial as they are essential to the well-being of patients and society. This rapidly evolving situation has led to pivots and changing responses. The dynamic and fluid nature of COVID-19 in the context of varied levels of risk perception highlights the critical need for self-efficacy in response. Can we keep ourselves safe in healthcare contexts? Will patients fear going to hospitals, clinics, or their dentist? Is the risk for COVID-19 highest among caregivers?

Our goal in this chapter is to examine communication and evidence-based design (EBD) research, theory, and practice applicable to COVID-19. We examine how frameworks of hazard control and risk perception can address pandemic responses in the design of healthcare systems. We describe how the pandemic has affected typical hospital design, the use of communication technology in this new context, and how communication and EBD alter in times of crisis. Communication is essential to develop proper messages that reach target audiences. EBD is crucial for mitigating infection transmission through purposeful design.

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Brief Introduction to COVID-19

COVID-19 is the third coronavirus to impact our nation and the world. It is a zoonotic virus named by the WHO on February 11, 2020 for the disease caused by the novel coronavirus SARS-CoV-2. It was first observed in Wuhan, China in late 2019 and has since spread worldwide. SARS stands for severe acute respiratory syndrome, and COVID-19 is a genetic cousin to the coronavirus which caused the SARS outbreak in 2002. Only seven coronaviruses are known to cause disease in humans; four of them cause symptoms of the "common cold." Their names are 229E, OC43, NL63, and HUK1. Three human coronaviruses cause much more serious lung infections of which COVID-19 is one.

A few facts on the virus will help to explain the reaction and the impact it has had worldwide. First, as a virus, it is among the smallest microbes and has a unique quality that increases its pathogenicity and transmissibility. Viruses, unlike bacteria, require a host to survive. However, its survival time without a host on which to feed is unclear. Van Doremalen et al. (2020) found that SARS-CoV-2 remained active on plastic and stainless-steel surfaces for two to three days under the experimental conditions. It remained infectious for up to 24 hours on cardboard and four hours on copper. The virus was detectable in aerosols for up to three hours. These times will vary under real-world conditions, depending on factors such as temperature, humidity, ventilation, and the amount of virus deposited. Kampf et al. (2020) found that the past two coronaviruses could live on surfaces up to nine days, but it is unclear if this is true for SARS-CoV-2. The CDC notes that the virus can be deactivated by handwashing with soap and water for a minimum of 20 seconds or using hand gel with a minimum of 60% alcohol.

Theory

Theories of public health and infection control have been driving the practice of healthcare for many years. The history of science has shown how the evolution of theory, from miasma theory to germ theory, has informed our understanding of virus transmission. In the science of design and communication, theories have helped inform practice.

A fundamental theory for understanding communication, COVID-19, and healthcare design would be systems theory. It is a practical theory for understanding how various forces are interconnected. Systems theory facilitates understanding for how healthcare system structures affect processes and outcomes (see Real et al., 2017 for a recent example of this in relation to communication and healthcare design). Sociotechnical theory (Baxter & Sommerville, 2011; Luke & Stamatakis, 2012) describes the interaction between complex infrastructures and human behavior and explains how healthcare systems are influenced by changing technologies which require social adaptation. For example, the rise of telehealth due to COVID-19 can be explained in part due to the social and technical systems in healthcare. Considering healthcare as a nonlinear system suggests healthcare organizations are dynamic systems (Cordon, 2013). For example, chaos theory, which describes how small changes

in one part of the system can lead to broader, system-wide changes far from where they originate, can inform how the spread of the virus turned into an emerging disaster affecting the entire world (Filipe, 2020). Complexity theory suggests that nonlinear interactions occur with unexpected outcomes; surviving systems are those that are adaptive through self-organization, learning, or other factors (Luke & Stamatakis, 2012). The social system risk can signify the uncertainty of the crisis and response. Systems theory provides an overview for understanding healthcare systems in crisis during pandemics.

In his theory of supportive design, Ulrich (1991) observed that stress exacerbates every known clinical condition and theorized that facility and environmental design elements that reduce stress can be supportive of patients, families, and staff in medical settings. In communication, the Risk Perception Attitude (RPA) framework (Rimal & Real, 2003) is designed for audience segmentation to tailor messages to the right people. This approach can be effective because it focuses on efficacy-related messages useful in a pandemic. RPA and Hierarchy of Control models can be used in conjunction with EBD to reduce the impact of the pandemic.

Risk Perception Attitude Framework

The RPA framework (Rimal & Real, 2003) is an effective method of audience segmentation that has been extensively tested with health and risk behaviors (Deng & Liu, 2017; Lee & You, 2020; Real, 2008; Real et al., 2013; Rimal et al., 2009; Rimal & Real, 2003). RPA classifies people into one of four groups based on their risk perceptions and efficacy beliefs for purposes of tailoring appropriate messages. The two *high efficacy* belief groups have most often been found to engage in the highest protective behaviors in the face of risk. The responsive group (high risk, high efficacy) is one where individuals perceive their own vulnerability to a risk and believe they understand what to do about it. The proactive group (low risk, high efficacy) is composed of individuals who feel confident in their ability to properly address the risk, even if they themselves do not perceive they are individually susceptible.

On the other hand, *low efficacy* groups often suffer poor outcomes. The avoidance group (high risk, low efficacy) are those individuals who perceive a risk yet are less able or motivated to engage in self-protective behaviors. The fourth group, indifference (low risk, low efficacy), is one where individuals are least likely to take any protective actions because they do not believe they are at risk and do not have confidence in their ability to respond properly to the threat.

As seen in Figure 4.1, each of the four RPA groups is hypothesized to differ from one another in terms of their responses to a given risk or threat (Rimal & Real, 2003). These responses may range from information searches to seeking help to behavior change. It is important to note that these psychographic profiles are context specific. In the case of COVID-19 risk perceptions and efficacy beliefs, individuals may be highly successful in their particular areas of work, life, or expertise, yet may have quite divergent beliefs about the novel coronavirus for a host of reasons (noted above) that can influence their risk perceptions and efficacy beliefs.

The value of an audience segmentation model is that it allows message designers to reach the right people with the right message at the right time (Real et al., 2013).

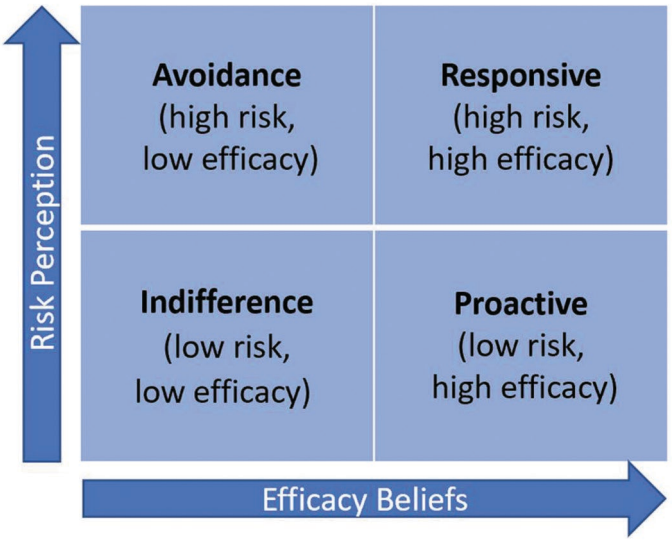

Figure 4.1 Risk perception attitude framework. *Source:* Modified from Rimal and Real (2003).

Further, risk messages are combined with efficacy so that people understand what actions they can take to mitigate risk (Heath & O'Hair, 2010; Rimal & Real, 2003). Messages can be designed for each group.

High-efficacy groups (responsive, proactive) can receive messages that reinforce their efficacy beliefs while underscoring the risks they face. Low-efficacy groups can receive messages that enhance COVID-19 prevention efficacy beliefs while addressing their risk perceptions. Efficacy is an issue when there is a shortage of Personal Protection Equipment (PPE), mixed information, and no norms in place supporting public wearing of masks. Unlike Asian countries, which have dealt with health crises before and have more cooperative social norms around individual health and freedom, the United States has few norms or little recent history around wearing masks to prevent disease spread (Friedman, 2020). Even with these challenges, message designers using evidence that face masks reduce the spread of COVID-19 can build efficacy (confidence to meet challenge) while addressing threat perceptions (risk) to increase individual willingness to change behavior (see Chou et al., 2020; Lyu & Wehby, 2020). Another element for communicating science relates to hierarchies of control in reducing the pandemic.

Hierarchy of Control

The CDC (2020c) has used the National Institute for Occupational Safety and Health's (NIOSH) Hierarchy of Controls to discuss the implementation of PPE during the COVID-19 pandemic. The Hierarchy of Control is a strategy that originates from the NIOSH Prevention through Design national initiative to determine how to implement effective hazard control solutions. The hierarchy, commonly depicted as an inverted triangle, is divided into five sections ranging from most effective to

least effective: (i) Elimination, (ii) substitution, (iii) engineering controls, (iv) administrative controls, and (v) PPE (see Figure 4.2).

The American Institute of Architects (AIA) (2020) has used a version of this model to provide a range of general mitigation measures to consider when reopening public-use facilities around the country. It is used with the understanding that the risk of infection can only be reduced, not eliminated entirely. In this document, the AIA (2020) uses a checklist format to walk owners and others through considerations for facility reopening during COVID-19. AIA notes that the first two levels of priority (PPE and administrative controls) are minimally impacted by aspects of the built environment. Administrative controls include policies, procedures to reduce the spread of pathogens (human), procedures to reduce the spread of pathogens (fomites), and procedures to support physical distancing.

The third level of priority, "Architectural and engineering controls," is defined as "Isolate persons from workplace-related SARS-CoV-2 exposure. Where appropriate, these controls reduce exposure to hazards without relying on occupant behavior and can be cost-effective to implement" (AIA, p. 5). These engineering and design controls include aspects of programming; space planning; non-structural partitions and openings; signage; plumbing and plumbing fixtures; mechanical and passive ventilation; electrical, lighting, and communications; appliances, equipment, and accessories; finishes and furnishings; and site work. The fourth level of priority is "Substitution." This level is focused on substituting an element, perhaps through design, which offers

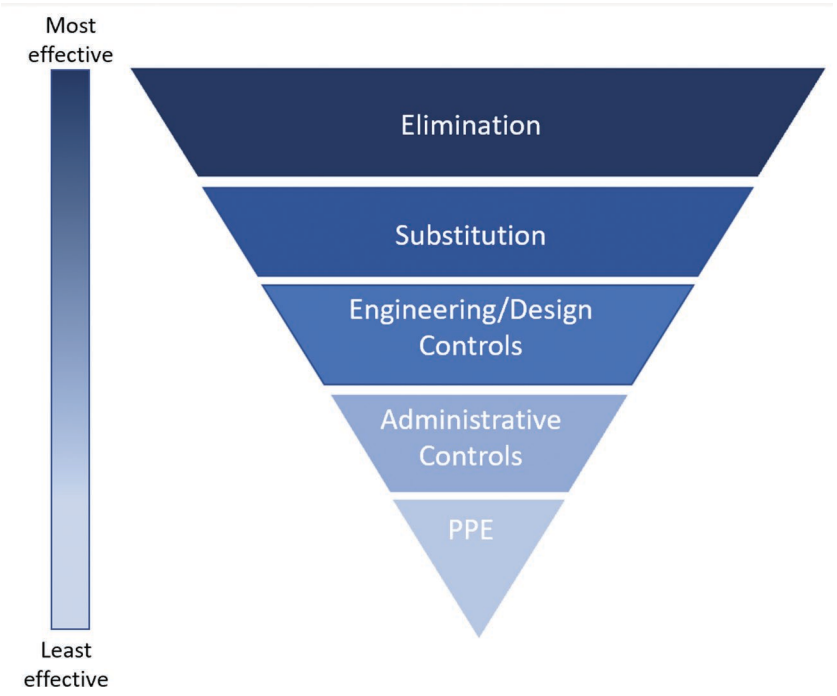

Figure 4.2 Hierarchy of controls applied to COVID-19. *Source:* CDC (2020c); AIA (2020).

lower risk than the original element. For example, substituting HEPA filtration for conventional filtration to reduce risk or replacing lead pipe water lines.

Finally, the fifth level of mitigation or protection is "Elimination." The most powerful and effective means of reducing risk is to eliminate the source, often through design. Consider how the removal of a doorway might eliminate the potential for undesirable traffic or contamination between two spaces. AIA's adaptation of this framework is an example of how aspects of the built environment impact the public's health, safety, and welfare during a pandemic. These are important as we consider communication and healthcare design in crises.

Science Communication and EBD in Pandemics

Healthcare organizations are complex systems, and in addressing COVID-19, they face uncertainty as well as urgency from patients, caregivers, and other stakeholders (Bradley et al., 2020). The level of threat, high levels of unknowns, and possible exposures created a need for healthcare systems to address risk. Healthcare organizations were required to communicate about the crisis without knowing what the present, let alone the future, held for their patients and staff. In some cases, temporary alternative care facilities established in New York, Detroit, Boston, Philadelphia, Dallas, and New Orleans helped flatten the initial curve (Rempfer, 2020). However, cases continued to rise, in some areas to almost unmanageable levels. Healthcare facilities are presented with unique challenges during times of pandemics. There are few options for social distancing to prevent infectious spread in these settings, and there are only a limited number of patient rooms within a hospital or healthcare facility designed to address or prevent airborne respiratory viruses (Dietz et al., 2020).

Risk and crisis communication scholars have long noted how the uncertainty of situations require adequate communication. Coombs and Holladay (2010) stated that crisis communication is "the collection, processing, and dissemination of information required to address a crisis situation" (p. 20). The WHO describes risk communication as "the exchange of real-time information, advice and opinions between experts and people facing threats to their health, economic or social well-being" to "enable people at risk to take informed decisions to protect themselves and their loved ones" (WHO, 2020a, "General Information" section). These definitions are important to understanding science communication, which has been described as the "use of appropriate skills, media, activities, and dialogue to produce" awareness, enjoyment, interest, opinions, and understanding of science and related matters (Burns et al., 2003, p. 191).

Practical recommendations for effectively communicating science include knowing the audience so you can best tailor your message; establishing trust and credibility which may take relationship-building and involves providing credible, evidence-based information rooted in science and research; establishing a goal for communication by knowing your purpose (to inform, persuade, and so forth); and understanding what you want to happen (e.g., increased engagement). A key message that is brief and distilled down to specific content and why it matters must be developed. Understand and select the proper channel or medium for the communication and tie it to the audience (outreach, social media, etc.). People are more engaged with stories than facts and figures. Language should be accessible for the intended audience, and, if appropriate,

analogies and metaphors can explain complex concepts. Communicators must be willing to engage in a conversation with the audience to better understand their positions (American Association for the Advancement of Science [AAAS], 2020; Burns et al., 2003; Dietz, 2013; Fischoff, 2013).

These recommendations can serve risk, crisis, and science communicators well, particularly given the apparent ideological and age-related divides involving risk (susceptibility and severity) and efficacy beliefs (how confident people are they can protect themselves) during the pandemic. News reporting during this time indicated factors such as political affiliation, gender, race, income, and geography played a role in how individuals respond to the pandemic (e.g., wearing a mask; Buchwald, 2020).

Communication and Built Healthcare Environments

Research findings indicate a relationship between built healthcare environments and patient care processes, quality, and care outcomes. Ulrich et al.'s (2008) review of over 600 healthcare design studies found evidence not only for the design–patient outcome relationship but also for the relationship between physical layout and communication in healthcare. These findings range from patient room designs (e.g., single rooms are better for private discussions than shared rooms) to nurse station location, where more recent research has found that centralized designs improve nurse-to-nurse communication and learning while decentralized designs improve nurse-to-patient time and communication (Hamilton, 2017; Real et al., 2017; Zborowsky et al., 2010). EBD (Hamilton & Watkins, 2008) and research-informed design (Peavey & Vander Wyst, 2017) are approaches that base design decisions on the best available current research.

A recent review (Dietz et al., 2020) suggested multiple pathways for the spread of coronavirus as well as control and mitigation efforts in the built environment. They noted that although there were behavioral measures in places (wash hands, wear mask, and social distance), there were buildings and spaces where many people worked in proximity and thus were exposed to more risk than desired. In these cases, changes to signage, surfaces, and building ventilation can be made to improve safety. Design for communication must change as well. Modern hospitals have been designed to encourage interactions among a variety of caregivers. Open team spaces and hallway nurse charting positions are designed as spaces where individuals can engage in communication, yet these types of spaces also increase the probability of disease spread. COVID-19 is changing the way individuals work in healthcare facilities.

Information and data available in mid-2020 from architecture and design practitioners include public webinars and white papers. In a webinar of practitioners held by the Center for Health Design (CHD) (2020, May), a practitioner from Penn Medicine described design solutions implemented that impacted how hospital staff communicated. One of the key methods was moving all equipment out of patient rooms to reduce the number of times staff were required to enter rooms. With the shortage of hospital PPE, this reduced staff exposure to disease/patients. Communication between patients and caregivers occurred in several novel ways, including signs pressed against patient room windows, iPads provided to patients and staff, and providers standing at patient room windows with mobile phones. Staff reported wearing PPE "demolished their relationships with patients," who were often frightened (CHD, 2020, May,

"Solution Implementation" section). Some staff put their photo IDs outside their PPE, so patients could see their faces and better connect. A physician/architect from Stanford noted the use of twice-a-day huddles within both old and new units being used and repurposed to address capacity.

In another webinar (CHD, 2020, June), global design and health practitioners described their recent experiences and lessons learned. A NIOSH researcher described how early on, if one saw a mask, it was scary; over time, it became more accepted, comfortable, and a sign of protection. He indicated communication was necessary with all stakeholders, including employees, for explaining why best practices are important and protective, especially when multiple languages are spoken. He described communication toolkits and checklists, which make it easier for facilities to implement guidelines. A designer working in Rwanda, with experience addressing Ebola, described how she had to redesign facilities on the fly and employed research-based rapid response protocols involving equipment, infection control, patient rooms, and design hacks by the hospital and its MDs. For example, they used color-coded signage for "hot" (infection present) rooms in a context where spatial literacy varied. She further noted that although technology is evolving to replace face-to-face interaction, she believed that face-to-face communication was important for trust. Thus, her team worked hard to create workstations where MDs could enter information into tablets while facing patients.

These approaches extend to how physical spaces in healthcare facilities are used for communication and work, from design of hallways to design of patient rooms (Hamilton, 2017; Ulrich et al., 2008). Patients, families, visitors, and healthcare professionals understand the specific logic of designed layouts, whether for infection control (Ulrich et al., 2008), hospitality (Wu et al., 2013), or identifying inhabitants and visitors (Hillier & Hanson, 1989). For example, patients know certain spaces are designed specifically for them, such as waiting rooms or patient rooms. They likely know, without having to be told, that other areas (physician offices, labs) are off-limits. This "social logic" of space, as Hillier and Hanson (1989) note, guides the location and type of communication (e.g., private conversations in private spaces).

With change associated with COVID-19, communication norms have also changed. Instead of entering patient rooms, providers may communicate through windows using signs or technology. Future designs may be based on new social logics that include infection control, social distancing, and one-way walking patterns to reduce chance encounters and spread.

In renovated and newly designed spaces, providers may need to develop performance efficacy and learn new skills. Communication is more than simple information exchange and includes the ability to develop rapport, express empathy, and help patients generate plans (e.g., discharge planning). These are learned skills that can systematically address a health pandemic. These skills can be developed through cultural, technological, and structural elements that mitigate risk (Coombs & Holladay, 2010). Cultural communication approaches may reflect the extent to which patients, families, and caregivers are comfortable in adapting their communication with others in the new situation (e.g., communicating through windows or plexiglass). If we consider communication to be a practice of meaning construction as well as information exchange, new forms of communication and related modalities should reflect the values of the culture. The surrounding space can be designed to facilitate new approaches.

For example, healthcare designers are redesigning living environments for seniors, one of the most vulnerable at-risk populations, into distinct neighborhoods with one-way outdoor walkways to reduce overall exposure and increase social distancing (Mohlenkamp, 2020). These kinds of design changes can create new modes and types of communication in such spaces.

Pandemic and the Typical Hospital Design

Design strategies currently exist for preventing infectious disease in hospitals (CDC, 2017). It should be obvious, however, that the typical community hospital of today and many teaching hospitals are not prepared to deal with epidemics or pandemics. In the United States, the requirement is that only 10% of the beds on any unit must be isolation rooms designed to prevent the spread of communicable disease (FGI, 2018). In normal practice, this means dedicated airborne infection isolation (AII) rooms, often at the end of the corridor, designed with an anteroom and negative pressure for the ventilation system. Negative pressure means that when a door is opened, the air stays in the occupied space rather than escaping or mixing with air outside the room which is under a higher pressure. There are methods to reduce the spread of airborne, waterborne, and surface contact pathogens.

Engineering and architectural designs to reduce airborne pathogens include specifications for heating, ventilating, and air conditioning systems (HVAC). Properly designed HVAC systems will feature filtration (usually HEPA, or high-efficiency particulate air), control of humidity (RH 40–60%), and be broken into zones that can be separated (ASHRAE, 2019). When a zone covers a full or partial unit, it may present a threat by recirculating contaminated air from multiple spaces. Isolation rooms, normally with negative pressure, directly exhaust the space and do not recirculate air to a larger zone.

Response to the COVID-19 coronavirus must consider that it spreads easily as an aerosol, thus challenging the safety of indoor environments. While it is diluted in outdoor settings, the virus is a greater risk inside a building. The two methods of dealing with the virus are ventilation and filtration (Brownell, 2020). Ventilation dilutes contaminated air with fresh air and moves it toward exhaust while filtration can remove it completely. An appropriate strategy for control is to utilize 100% outside air with multiple air changes per hour, far-UVC ultraviolet light (not harmful to humans) in air ducts, and filtration that exceeds the 0.3 micron barrier of HEPA filtration (the SARS-CoV-2 particle is only 0.1 micron). Such filters are being developed to be combined with heating to kill the virus (Brownell, 2020).

Designs to reduce waterborne pathogens include chemical water treatment and water temperature. One strategy is to heat the p-traps under sinks to kill pathogens that are trapped in the drain. Recirculating water systems, such as cooling towers or fountains, must guard against organisms like Legionnaire's that can proliferate when temperatures are not controlled (Andersen, 2019). We know that hand hygiene is an important individual strategy to reduce infection, and controlling the water temperature at sinks makes this activity more effective (Pittet et al., 2006).

Contemporary designs use a variety of methods to reduce the presence of surface borne pathogens. Choice of the surface material is the first decision architects and

designers must make. Materials for walls, floors, ceilings, millwork, casework, and furnishings may be chosen for their cleanability or the effectiveness of their antimicrobial or biocide characteristics. Examples include the range of manufactured carpet products or furniture fabrics which offer antimicrobial resistance (Harris et al., 2010) or copper alloy products that function as a biocide that can actively kill pathogens (Weber & Rutala, 2013).

In addition to selection of materials that help control pathogens, cleaning products must be chosen to decontaminate and disinfect the environment. Most cleaning materials are in the form of liquids or wipes. Some particularly powerful cleaners, such as heavy concentrations of bleach, damage the materials upon which they are used (Truscott, 2017). Other decontamination methods utilize gasses instead of liquids. One method is the use of a hydrogen peroxide aerosol to decontaminate materials with a fog of hydrogen peroxide gas in a closed setting (Andersen et al., 2006), such as a patient room or an ambulance.

Waste disposal is a problem for all health facilities which must deal with chemicals and other infectious material. The problem is even worse during an epidemic or pandemic, as when dealing with the volumes of infectious human waste and toxic biohazard, waste is multiplied.

Dealing with Overwhelming Numbers

The problem for epidemics and pandemics is the overwhelming number of contagious cases. A typical hospital is well-suited to deal with a modest number of infectious cases, and contemporary design offers multiple protections against cross contamination. Protections include individual private rooms and toilets, multiple hand hygiene facilities, HEPA filtration along with multiple air changes per hour, and choices of antimicrobial and biocide materials for room and furniture finishes.

Designing for widespread infectious disease and highly contagious pathogens, as in the case of epidemic or pandemic situations like SARS, Ebola, or COVID-19, is more complex than a typical hospital's defenses. It is difficult in normal times to justify expenditure for large-capacity specialized facilities that are not needed at the moment, but might be at some point in the future. The increased demand for facilities in the unusual circumstances of an epidemic, pandemic, or local disasters like hurricanes, floods, or earthquakes need to be met in rapid response to the crisis. For this reason, many rely on surge capacity in facilities that were not originally intended to serve in a hospital role.

Surge capacity can be found in many ways. The military and some humanitarian organizations are able to deploy field hospitals as a means of disaster response. Cities have converted hotels, convention centers, and other non-medical buildings to temporary use as hospitals (Shabaniliya et al., 2019). Some hospitals may have older rooms that previously accommodated two patients. Conversion of acute patient units for intensive care and of other hospital spaces to accommodate increased numbers of patients is one strategy. Hospitals have been able to expand their capacity through the use of tents or enclosing parking structures. New hospital designs may include single patient rooms capable of accommodating two beds and featuring panels that conceal additional electrical and medical gas connections in the case of additional demand.

International Design Lessons

Some governments have made an investment in preparing for infectious disease. Scandinavian and Northern European countries have a long history of efforts to avoid infections, especially resistant strains of pathogens (Mölstad et al., 2017). Their efforts include practical policies like elimination of antibiotics in livestock and poultry. Their physicians are encouraged to limit prescribing of antibiotics, and the public is encouraged to complete the full regimen when they must take an antibiotic. They assume most non-native persons, such as US, British, or Italian citizens, to be infected until tests show them not to be, whereas in the United States, patients are assumed *not* to be infected until tests indicate otherwise.

Sweden is somewhat unique in having a medical structure in which infectious disease is a third branch, fully equal to medicine and surgery. This results in every Swedish county having a dedicated infectious disease hospital. The two largest are at the country's main entry points, Stockholm and Malmo, where foreigners or Swedes returning from their exotic "sun holidays" can be checked for fever at the airports or train stations, and if need be, transferred directly to an infectious disease hospital or clinic.

The infectious disease hospital in Malmo, designed by C.F. Möller, is adjacent to the main Skane University Hospital and is accessed directly from the outside (Holmdahl & Lanbeck, 2013). Patients can enter the emergency department exam room or the infectious disease clinic from the outside, without passing through other parts of the building. Patients being admitted are taken to their rooms by an external elevator and circulate on an open exterior balcony to reach their inpatient room via a generous anteroom. Visitors use the same exterior access while staff circulates on an interior ring corridor that also features anterooms.

Canada, and especially Ontario, suffered from the SARS epidemic in the early part of this century. New hospitals being designed in the area are attempting to take advantage of lessons learned from their experience with such a contagious and infectious virus. One example from the new designs includes recognition that a modest number of negative isolation rooms will not suffice in the face of an epidemic or pandemic. The need for more isolation includes greater use of negative pressure, 100% fresh (not recirculated) air, and higher levels of filtration (Harvey, 2020). Current Canadian examples include planning of entire units as isolation units, rather than a cluster of isolation rooms on a unit. What this means is that the entire unit can quickly be converted to an isolation chamber with spaces specifically designed to accommodate complex donning and doffing of protective gear (Harvey, 2020).

The Chinese government built multiple specialized infectious disease and respiratory disease hospitals as a reaction to the SARS epidemic which had originated in China. These hospitals are dedicated to treatment of patients who need to be isolated. They often feature corridors along the outside wall for family members to reach a patient's room where they can communicate through glass while the staff circulates separately on an inner corridor.

More recently, the Chinese government famously built two modular surge hospitals with extraordinary speed in Wuhan for 1,000 or more beds each, using military manpower, automation, and equipment to rapidly complete them as a response to the

COVID-19 outbreak (Luo et al., 2020). These facilities should be understood as serving much like rapidly deployable field hospitals which were constructed on concrete foundations with full-service plumbing. Patient circulation is from the perimeter, including a view window and a pass-through window for food and supplies, and an internal corridor for the clinical staff. Importantly, these facilities had been planned since the SARS epidemic; speed is enhanced by advance preparation.

One Chinese study (Li et al., 2007) examined the earlier SARS situation by comparing units that experienced respiratory outbreaks with those that did not. It addresses the needs of staff who work long hours in extreme levels of protective gear. Findings revealed that providing shower facilities for staff on every unit has been correlated with reduced spread of infection.

Communication of Risk

When an epidemic or pandemic is active, there is a need to communicate the level of risk to the regional or national community. The DORSCON system (Disease Outbreak Response System Condition) in Singapore is an example which features a green, yellow, orange, or red level with advice for the public precautions based upon the seriousness of the disease threat (Vidyarthi et al., 2020).

Within the hospital, communication within centralized units is important. As clinicians find themselves scattered to patient rooms or clusters of rooms, and unable to return to the central position, the use of oral communication is vital. Similarly, remote video monitoring to central locations can be helpful. Communications at decentralized locations for documentation, supplies, or medications is important as staff movement is limited by the need to remain close by patients.

The recent pandemic has surfaced issues of communication within the patient room. When the clinical staff are working in cumbersome PPE and the patient may be under an oxygen mask and on noise generating devices, like a ventilator, it can be difficult to communicate, either clinician-to-patient or clinician-to-clinician. Staff attempt to reduce the number of times they must enter the room, donning and doffing their gear, so they have found ways to adapt, including ways to remotely read the data from equipment in the room, and even keeping equipment just outside the room with long umbilical connections. Features like a pass-through into the patient rooms, sometimes called a nurse server, can alleviate some of the trips in and out of the room, as can locating a medication safe within the patient room. Runners can bring needed supplies and medications to nurses in a patient room, so the nurse does not have to leave and change their cumbersome gear. Runners can also take specimens away from the room to be tested. New designs should consider alternate designs to simplify complex communication.

Design and Outpatient Facilities

Hospitals and outpatient facilities prepared to deal with infectious disease should be planned to include ambulance access directly into treatment and resuscitation zones and an entry point for those with fever or who are to be immediately isolated, along

with a separate typical walk-in entrance. There should also be space for testing patients that minimizes exposure to staff and isolates those being tested.

There has long been a model for care and testing during flu season. Hospitals, and especially children's hospitals and clinics, like Kosair Children's in Louisville or Texas Children's in Houston, have provided parking lot care in vehicles in order to protect others from potentially contagious patients. Clinics should establish plans to serve their patients and community without entrance to the internal clinic space. Versions of drive-through care will need to be more common, including covered positions for cars and communication devices similar to fast food restaurant speaker systems.

For more than two decades, there has been a pervasive shift in care from the inpatient hospital to outpatient settings. Some predict that this trend will continue or accelerate due to public perceptions about dangers in hospitals following the COVID-19 experience. This means ambulatory centers, clinics, physician offices, and outpatient settings will need to be designed to serve the requirements of social distancing and protection from cross-contamination.

Outpatient settings will need to have reception areas, registration, and cashiering activities designed to protect staff and patients. Some organizations have begun to use online systems for virtual patient check-in. Separation of staff and the public with clear plastic panels, called "spit shields" in the restaurant business, can help with social distancing, while waiting spaces may need to be configured to provide space between individuals or small groups (for instance, husband and wife, or mother and child). This will mean that the capacity of future waiting spaces may be smaller than previous planning criteria. The potential for better scheduling of narrower time slots may help reduce problems of undesirable overcrowding. There will be attention paid to air changes and filtration in the mechanical ventilation of outpatient settings.

While some of the outpatient care will move to telemedicine, much of the work of outpatient care and treatment will be similar to the way it occurs today. Laboratory work and specimen collection necessary for diagnosis and evaluation will continue to be done by phlebotomists and lab technicians wearing gloves. Both technicians and patients may be required to wear masks, and the technicians may more often be wearing eye protection. If the patient is not seen in some form of a virtual visit, the typical examination room already has safety features like a handwashing sink, alcohol gel, gloves, and paper covering of the examination table. What may change is the use of face masks for physician, nurse, and patient, along with face shields or eye protection for the clinicians.

Growing Role of Home Care

It is worth noting that advice for persons suspected or confirmed with COVID-19 has been to stay at home, if possible. People have been advised not to appear at the emergency department and to contact a physician before going to a hospital. Persons with mild cases of the coronavirus were asked to treat themselves in isolation at home, getting care via telemedicine and the telephone. The increasing shift to home care will certainly be a factor in the future response to epidemics or pandemics.

Evidence-based Design Decisions

As practitioners are asked to design facilities appropriate for the high volumes and high risks of caring during an epidemic, pandemic, or disaster response, it is important for design decisions to be made on the basis of best current credible evidence. Evidence-based or research-informed practitioners interpret the implications of research on their decisions to improve the quality of design (Hamilton & Watkins, 2008).

Technology Applications for Design and Communication

Technology Planning and Design—Pre-COVID

The design of technology and communication for healthcare environments has traditionally involved low voltage planning; defining the size and location of the communication closets; determining cable tray size, placement, and raceways for infrastructure; and identifying the number of data drops necessary for required wired equipment. In the last decade, the introduction of wireless technology, mobile computing, cellular connectivity, and data analytics has catapulted healthcare technology into the twenty-first century creating a connected ecosystem that enables communication and the digitization of healthcare. Today, we are at the crux of a revolution with the use of artificial intelligence, genomics, sensors, and machine learning to augment medical care and transform healthcare delivery (WHO, 2020b).

Over time, these technologies have transformed workflows, care delivery models, pharmacy/specialty services as well as payment structures and payer incentives. Following are examples of technology utilized in healthcare settings to drive improved operations, efficiencies, and outcomes (Anderson & Vogels, 2020; Manjunath, 2020; Marr, 2020; Padmanabhan, 2020).

- ***Computers and Electronic Health Record (EHR)*:** Perhaps the most significant change in healthcare delivery is the computer and electronic health record. Fixed computers or computers on wheels have been placed at the patient's bedside to improve charting efficacy.
- ***Nurse Call System*:** Nurse call systems that communicate between patient and staff are a safety feature mandated by regulatory agencies. Systems have differing levels of sophistication and complexity that enable patients to signal nurses using a call button with coordinating sounds and lights directing them to the corresponding room. Some include a feature for two-way communication or selection of specific requests such as pain, water, or bathroom needs.
- ***Real Time Locating Systems (RTLS) & Radio Frequency Identification Systems (RFID)*:** Technology systems that locate patients, staff, or assets (e.g., medical equipment) can improve clinical workflow; support care coordination; and improve quality, safety, and overall efficiency. This technology is being used to create "smart rooms." As caregivers enter the room, their names and roles automatically appear on the patient's television monitor. This locating system can integrate with the nurse call system as well.
- ***Mobile Phones*:** Mobile communication from cellular smartphones has transformed communications over the last decade. Secure texting has also become a function of the smartphone and has enhanced communications among physicians and support staff.

- ***Patient Education System*:** Educating patients about their care team, schedule, and health status is a capability of these "edutainment" systems. Integrating the TV with on demand videos or materials can assist patients in understanding their treatment or at home care after discharge.
- ***Autonomous Vehicles (Robots)*:** Robots have been adopted to deliver meal trays, linens, and pharmacy items. This technology is gaining traction and requires designed integration with elevators and both functional and public spaces.

Technology Planning and Design—Responding to the COVID Pandemic

- ***Communication and Workflow Strategies*:** The COVID-19 crisis threw all technology barriers and "red tape" out the window. As patient floors were converted to COVID-19 units, hospital staff had to become creative and innovative to optimize workflow and communicate with staff, patients, and family, as well as to protect themselves from the virus.
- ***Communication with Patients*:** As staff had to be protected with gowns, gloves, and facemasks, constant travel into and out of patient rooms became impractical due to PPE shortages. Staff discovered ways to communicate with patients via the in-room phone, notes or sign language through windows or glass doors, and even walkie-talkies.
- ***Communication with Family—Video Calls*:** Due to the "no visitor" policy, staff were tasked with helping patients communicate with their families. Many nurses used their personal phones to make video calls (e.g., FaceTime) to connect patients with family members. Some families sent in technology (e.g., Alexa Home) that enabled video chat as well as commands for patients to enjoy their music or call family simply by using their voice.
- ***Staff Identification*:** As staff members were masked, patients were not able to see faces. Some staff took Polaroid pictures, put them in plastic baggies, and attached them to their gowns so patients would have a face to put with the name.
- ***Equipment—IV Poles and Ventilators*:** During the pandemic, nurses extended the tubing on IV poles and ventilators and kept them in the hallway, so the machines could be monitored without going into the patient's rooms.
- ***Telemedicine*:** Traditional standard office visit practices and behavior immediately pivoted to tele-visits. Some health systems even added staff as virtual assistants to help patients with the technology.

As we examine a new framework for technology based on lessons learned from the pandemic, how can we think differently about technology planning for the future? Table 4.1 describes how emerging technologies and associated risk perceptions align caregivers and/or consumers in proactive or responsive risk perceptions (Real, 2008; Real et al., 2013; Rimal et al., 2009; Rimal & Real, 2003; Sahbaz, 2020; Xiao & Fan, 2020). Although individuals may have lower efficacy beliefs, the technology may help mitigate the risk and improve the delivery of care, communication, and outcomes.

Table 4.1 COVID-19's impact on technology use for communication and risk perception.

Technology with Risk Perception (RP)	Impact of COVID-19
Computers and Electronic Health Records RP Responsive	Computers on wheels placed outside the patient room for documentation have been used instead of bedside documentation.
Nurse Call System RP Responsive	Staff utilizing the nurse call system to call for supplies to the room. Some hospitals designate staff as runners to bring supplies to the rooms to limit staff donning and doffing.
Radio Frequency Identification (RFID) RP Proactive	RFID utilized to optimize inventory as well as staff location.
Mobile Phones RP Responsive	Phones utilized to limit nurses going in and out of patient rooms—used them to communicate to other staff so they can bring supplies to them instead. Patient landline room phones were also used to communicate with other staff.
Patient Education System RP Proactive	Eliminates the need for face-to-face education.
Autonomous Vehicles RP Proactive	Supplies were delivered via autonomous vehicle to limit contact of staff.
Electronic ID System RP Reactive	China's electronic ID system enables the authorities to track people from the regions where the virus originates and keep the people they contacted safe.
Technology-supported Temperature Monitoring RP Reactive	Widespread use now in every setting. Kiosks have been located at entrances and throughout the facility to monitor and report wellness.
Virtual Care RP Reactive	Many healthcare systems have moved to self-triaging mobile apps to assist their population with checking for symptoms before requesting time with a specialist.
Telehealth RP Reactive	Increase in telehealth by up to 500%.
Chatbots RP Reactive	Chatbots have been utilized to answer questions about COVID-19 and assess for symptoms of the virus.
Healthcare Apps RP Reactive	Self-triaging apps.
Virtual Reality (VR) RP Reactive	Simulation training is developed using VR.
3D Printing RP Reactive	Ventilator and face shields made by 3D printers.
Contact Tracing RP Reactive	Used by the public health department to monitor and assess the spread of the disease.
Thermal Scanners RP Reactive	Utilized at airports and large public spaces.
Drones RP Reactive	Utilized to deliver medications and supplies.

Table 4.1 (*Continued*)

Ultraviolet Light RP Reactive	Used in collaboration with environmental services for cleaning.
Artificial Intelligence (AI) RP Reactive	Artificial Intelligence is utilized to identify, track, and forecast outbreaks as well as assist in the development of vaccines.
Internet of things (IoT) RP Reactive	The Internet and big data utilized to collect and aggregate data have been invaluable in contact tracing, monitoring symptoms, and reporting risks.
Wearable Technology RP Reactive	Wearable technology can predict changes in respirations and alert wearers in advance to possible COVID-19 symptoms.
Intelligent Spaces RP Reactive	Buildings are being equipped with heat sensors and temperature-monitoring devices to alert when someone may have a fever.
Cybersecurity RP Reactive	Global disruption for health, economics, political, and social systems are prey to cyberattacks during this vulnerable digital landscape.
Block Chain RP Reactive	Financial stability, supply chain management, and authentication are all areas where block chain has been applied during the pandemic.
Natural Language Processing RP Reactive	Voice-activated devices contribute to the optimal "touchless" environment needed during a pandemic.
Voice Activation RP Reactive	For patients who have limited movement, this is a new communication tool.
Facial Recognition RP Reactive	Facial recognition has been used to validate contract tracing and manage visitors and patients.
Online Shopping RP Proactive/Reactive	To improve social distancing and isolation, consumers have taken advantage of the digital platform for shopping.
Digital and Contactless Payment RP Reactive	Payment for services or goods has been converted to a contactless payment protocol. Signatures are not required, and limiting the number of touching keys is vital.
Distance/Remote Learning RP Proactive/Reactive	Remote learning is transforming the education system. All levels of education and training have been impacted by the inability to meet in person. Education platforms as well as teleconferencing technologies are replacing in-person classes.
On-line Entertainment RP Proactive/Reactive	This new platform for concerts, sporting events, musicals, etc. has become the norm. Facebook Live, YouTube, Instagram, TikTok, etc., have become outlets for entertainers and creative people to continue their work.
Teleconferencing RP Proactive	Teleconferencing platforms using voice and/or video chats have become the mainstream form of communication during the pandemic.

Case Study: Applying Evidence-based Design to Respond to a Pandemic

Recognizing that a shortage of ICU beds was a concern for all in healthcare, HGA and The Boldt Company partnered to provide an EBD, self-sustaining, and modular solution for quickly adding critical care beds anywhere (Boldt, 2020). It is a mobile

prefabricated module with Airborne Infection Isolation (AII) rooms that are attached to existing utility infrastructure. EBD was used to inform the design features such as:

- ***Private Rooms*** with separate air handling are considered best practice, as COVID-19 is spread via respiratory droplets, droplet contact on surfaces, and aerosols for a certain amount of time, depending on factors such as temperature, humidity, ventilation, and the amount of virus deposited (van Doremalen et al., 2020).
- ***Visibility*** is important. Hand hygiene compliance in rooms with dispensers in clear view was 53.8% compared to 11.5% in room with dispensers not in field of view (p = 001; Birnbach et al., 2010). This applies to location of sinks as well.
- ***Deploying Supplies*** has shown to significantly reduce staff travel by 1 to 1.5 miles a day and to significantly increase time spent in patient rooms by 6 to 10% (Freihoefer et al., 2013).
- ***Standardization*** of the headwall is critical. Although same-handed rooms are standardized, nurses see no need to abandon standardized back-to-back configurations (Pati et al., 2009, 2010, 2012).
- ***Bedside Charting*** can improve patient safety. Increased frequency of documentation at the bedside is linked to fewer falls in rooms (Watkins et al., 2012).
- ***Staff Well-being*** is important. Employees with a window view of nature report less stress, better health status, and higher job satisfaction (Leather et al., 1997).

As seeing in Figure 4.3, a modular solution for quickly adding critical care beds anywhere (Boldt, 2020), the STAAT MOD (Strategic, Temporary, Acuity-Adaptable Treatment) is a prefabricated modular design for an airborne infection isolation room. It is currently in use, and a post occupancy evaluation is planned to understand more

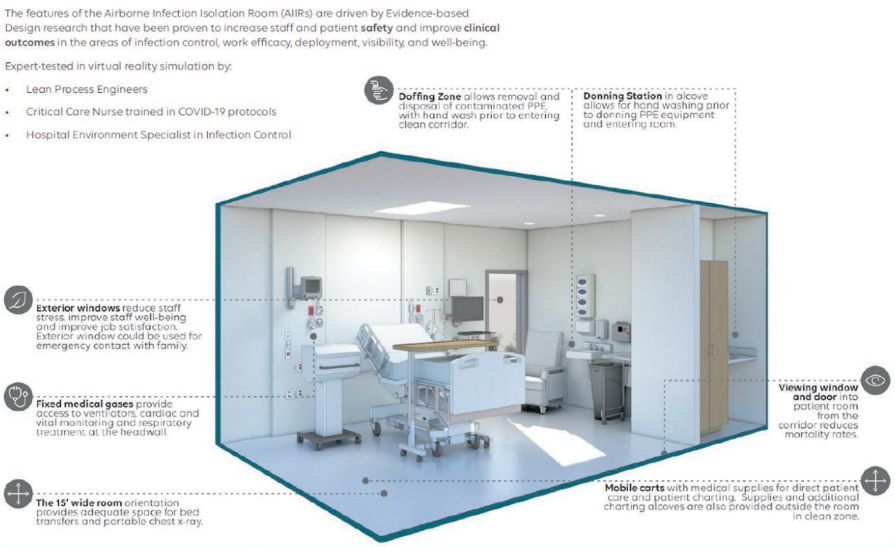
The features of the Airborne Infection Isolation Room (AIIRs) are driven by Evidence-based Design research that have been proven to increase staff and patient safety and improve clinical outcomes in the areas of infection control, work efficacy, deployment, visibility, and well-being.
Expert-tested in virtual reality simulation by:
Lean Process Engineers
Critical Care Nurse trained in COVID-19 protocols
Hospital Environment Specialist in Infection Control
Doffing Zone allows removal and disposal of contaminated PPE with hand wash prior to entering clean corridor.
Donning Station in alcove allows for hand washing prior to donning PPE equipment and entering room.
Exterior windows reduce staff stress, improve staff well-being and improve job satisfaction. Exterior window could be used for emergency contact with family.
Fixed medical gases provide access to ventilators, cardiac and vital monitoring and respiratory treatment at the headwall.
The 15' wide room orientation provides adequate space for bed transfers and portable chest x-ray.
Viewing window and door into patient room from the corridor reduces mortality rates.
Mobile carts with medical supplies for direct patient care and patient charting. Supplies and additional charting alcoves are also provided outside the room in clean zone.

Figure 4.3 Critical to quality design features of the STAAT MOD. *Source:* HGA.

about how these EBD features impact positive patient and staff outcomes. These are important, as new ideas and research directions are considered.

Innovations and Research Directions

One way to consider how communication and design can interact to combat COVID-19 may be to examine the application of the RPA framework (Figure 4.1) to the designed environment. For example, wayfinding is a key design element aimed at helping guide people through a facility using information systems (e.g., signage on floors, walls) designed to improve people's experience with a complex built environment. As seen in Table 4.2, for high-efficacy groups in healthcare contexts, wayfinding messages can be developed to reinforce efficacy beliefs. High-efficacy populations, like trained clinicians, look for and understand environmental cues, such as arrows on floors, digital signage, and color-coded room markers. Risk perceptions can be highlighted in high-risk areas and combined with efficacy. Messages such as "Entering COVID-19 risk area. Masks, PPE and Caution required" can spotlight risk with instructions on how to stay safe.

More important are messages to the low-efficacy populations, which in healthcare facilities, may range from patients, children, families/visitors (if allowed), ancillary

Table 4.2 Application of RPA framework communication and design responses.

Perceived Risk and Efficacy Beliefs	Communication and Wayfinding Response	Design Decisions as Response
Responsive group (high risk, high efficacy). Example: health professionals in high-risk clinical situations	Efficacy- and risk-reinforcing messages, signage, and landmarks	Design decisions involving access to what providers and patients need for safety. Lighting
Proactive group (low risk, high efficacy). Example: health professionals in non-clinical situations	Efficacy-reinforcing messages, wayfinding and artwork, and barriers	Design decisions involving access to what providers and patients need
Avoidance group (high risk, low efficacy). Example: Patients, patients impaired by medication, persons with language barriers, persons with cognitive impairment, ancillary staff; visitors to high risk, children, and clinical settings	Efficacy-enhancing messages and visual cues, clear sight lines, and simple pathways with obvious destinations	Design decisions for hallways, plexiglass, PPE, signage, wayfinding, barriers to entry, increase doorways for potential future barriers, more exits to the exterior, one-way flow for separation, and social distancing
Indifferent group (low risk, low efficacy). Example: visitors to low-risk settings and vendors	Risk-highlighting and efficacy-enhancing messages and visual cues	Design decisions for hallways, plexiglass, PPE, signage, wayfinding, and more

staff (e.g., patient transport and housekeeping), or persons with language barriers, cognitive, and/or vision impairments. Individuals in these groups may not always understand the risk, so there is a greater need for design thinking and communication strategies. Risks need to be highlighted, both in messages and in design combined with efficacy-enhancing messages. These may include stronger visual cues, changes in lighting (bright where you want people to go, dim for off-limits), clear sight lines to exits and bathrooms, and simple pathways with obvious destinations. As seen in Table 4.2, healthcare facilities can be designed for each segment of the population in terms of their risk perceptions and efficacy beliefs to address pandemic responses.

Considerations on Theory and Practice

Innovative Approaches

An innovative idea would be to consider how combining the RPA framework with design and the Hierarchy of Controls model may improve responses to this and future crises. An invisible element of protective design is the elimination of hazards. Design elements such as separation through airtight doors and walls in operating rooms eliminate risks. Administrative controls can be designed for low-efficacy populations, such as wayfinding, signage, and technology-enabled access badges. Healthcare designers can consider the Hierarchy of Controls as well as psychographic profiles of people that visit or work in a space as they create measures of protection.

Specific Research Directions

Numerous areas of future research can be pursued to improve our understanding of science communication and healthcare design in crises. First, drawing upon scholarship in long-term care facilities, which specialize in care for low-efficacy populations, future research can develop practical solutions to help these groups. For example, Lawton's ecological model of environmental demands and individual efficacy (Lawton & Nahemow, 1973) can be used to help address design concerns for low-efficacy individuals in healthcare. Individuals with high risk and low efficacy (avoidance group) may be served best by design that use Lawton's model, such as providing simple pathways with obvious destinations while simultaneously dimming the lights for non-use areas.

Second, understanding how design can affect norms about communication and risk offers a promising approach to addressing the challenges of communication and healthcare design. For example, norms of social trust are very important in times of crisis and pandemics. Examining descriptive norms (what people do), in conjunction with new safety-driven injunctive norms as to how people *should* communicate and act, can provide new insights into how people develop socially constructed risk and efficacy beliefs. Third, we need onsite multiple method studies in all areas to help us understand the interaction between perceived risk, communications, and aspects of design. The field is rich with opportunities for study.

Practical Implications

There are several factors for communication and design practitioners to consider as they understand the implications of communication and design before, during, and after a pandemic.

- Use of a framework such as Hierarchy of Controls or Risk Perception can provide a tool to generate and prioritize ideas for Crisis Management.
- Plan communication for the most vulnerable of the population so that it may be relevant and easy for all to understand.
- Assure aspects of the designed environment enforce the current understanding of the virus, such as the provision of 6-foot increments between people in a visual, perhaps, colorful way. Remember that not everyone is literate or uses English as a first language.
- Now is the time to be creative, even innovative, with technology. Its application should enhance its use to safely and competently communicate between sender and receiver.

Conclusion

There is a relationship between facility design and communication, and science can improve the performance of both. Examining how to apply communication science in the COVID-19 pandemic era through the lens of physical layouts and EBD contributes new frameworks for understanding communication in light of norms, risk, and efficacy. Response to the current and future pandemics can be more effective if both communication and design are optimized.What is especially tragic is that the current US health system is not organized to deal with a pandemic. The system is structured to reduce economic exposure and minimize inventory. That is why, nearly every healthcare organization uses a just-in-time delivery model and insurance companies, which represent non-productive overhead, work to reduce coverage for an entire population while millions are uninsured. All of this is only made worse when something like COVID-19 strikes. Even not-for-profit organizations struggle to increase margin and reduce every category of cost in the context of behaving like a competitive business instead of a public good. This means organizations have no incentives to plan with a long view and to prepare for the inevitability of pandemic or epidemic situations. This further means organizations must rely on government for accumulation of important supplies and resource stockpiles, and yet the government is also focused on reducing expenditures. Other countries provide outstanding examples of better ways to deal with these problems; there are more lessons to be learned.

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5

Identity and Information Overload

Examining the Impact of Health Messaging in Times of Crisis

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This chapter seeks to provide insight into how communication occurs during times of crisis, particularly health crisis. Three questions will be specifically addressed: (i) how does such communication occur, (ii) where, and (iii) with whom? In other words, what is the relationship between the likelihood to accept a message or call to action (e.g., adherence to medical recommendation such as hand washing) and (i) the channel on which it is communicated, (ii) the characteristics of the message (e.g., text-only, text + pictorial, and visualized data), and (iii) the amount of information (high/low) contained in a message. Understanding these relationships is essential to developing efficacious health crisis messages that mitigate harm and increase prosocial attitudes and behaviors.

This exploration is also helpful in identifying potential barriers to information processing and how these are exacerbated when they interact with individual differences. More precisely, this chapter seeks to explore the impact of the *how* (message processing; accept/reject message) and *where* of communication on vulnerable populations who are already at higher risk for information overload (Huang et al., 2012; Ramírez & Carmona, 2018) and decreased health literacy (Dolinsky & Feinberg, 1986), as well as disproportionately affected by health risk (Larson, 2018), particularly of COVID-19 (Krause et al., 2020).

Communicating Health and Risk in Times of Crisis

During times of crisis, the dynamism of mediated communication as a space to access and share information becomes highlighted (Westerman et al., 2014; Wolkin et al., 2019). Essential workers, emergency responders, and the general public make use of mediated channels of communication (i.e., social media) to both access and disseminate information (Zeng et al., 2016). Media, as a channel of communication, provides a stage for discourse of important health issues (Jones & Harwood, 2009; Wendorf Muhamad & Yang, 2017) and holds the potential to influence individuals.

Current Health Crisis, COVID-19

According to the Centers for Disease Control and Prevention (CDC, 2020a), coronavirus disease 2019 (COVID-19) is a novel (new) respiratory disease transmitted from

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person-to-person via respiratory droplets. Acknowledged outcomes range from mild symptoms to illness resulting in death, and it has been compared to other coronaviruses (e.g., SARS and MERS) due to its highly contagious nature (Liu et al., 2020).

To date, no treatment or vaccine exists. Therefore, prevention depends on mitigation (stopping the spread) advocated through the implementation of hygienic practices and social distancing (CDC, 2020a). Ensuring social distancing may impact how information is obtained and shared in social networks. In light of the changes in social functioning and social expectations experienced suddenly, information related to the COVID-19 pandemic stemming from credible and reputable sources might be decisive in addressing public action. A recent study by Roozenbeek and colleagues (2020) found that COVID-related news had consequential effects on behavior. More precisely, the authors found that susceptibility to misinformation significantly influenced individuals' willingness to adhere to recommendations (Roozenbeek et al., 2020).

Unfortunately, vulnerable populations (i.e., racial/ethnic minorities, elderly), known to be disproportionally affected by COVID-19, are also disproportionately penalized by lack of resources (e.g., education) necessary for health crisis information processing. One potential negative outcome of this, especially in a time of crisis, is information overload, the inability to discern what information is most salient, and/or the lack of retention of important information. Not only is the sheer amount of crisis-related information being generated potentially problematic for vulnerable populations, but also the manner in which it is presented may lead to information overload and/or resistance to message processing, thus leading to the inability to follow carefully the advocated procedures recommended by the health organizations such as the CDC.

The *How* of Communication

Studies (e.g., Lazo & Batlle, 2019; Turcotte et al., 2015) have found a significant decrease and historic lows in the public's trust in traditional channels of communication. These include mass media, governmental agencies, and the healthcare system. Additionally, there has been a shift in where emotional appeals seem to take precedent over journalistic ethics and objectivity, and this is perhaps most salient on social media channels (Turcotte et al., 2015). Unfortunately, the potential for exploitation of individuals via social media with emotional appeals has been identified as an effective tool by many (Turcotte et al., 2015), including organizations charged with communicating critical health information (Jaiswal, 2019). As such, it has become increasingly important to ensure that health information presented is reliable given the waning trust in sources (Baron & Berinsky, 2019). Beyond evaluation of message and source, how the information environment is constructed has been found to be of critical importance.

Scholars have examined how information-rich environments might lead to disparity. In these environments, individuals invoke varying heuristics to establish source and message credibility, among other factors (Van Der Heide & Lim, 2016). Information processing models such as the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986) and the Heuristic-Systematic Model (Chaiken, 1987), studied in the sharing of disaster-related information online (Son et al., 2020) and in microblogging platform (Zhang et al., 2014), highlight dual processing and the role of motivation in information evaluation, particularly in mediated (online) environments. According to these

theories, highly motivated individuals engage in rigorous evaluation of cues (see Chaiken et al., 1996), whereas individuals with lower motivation show a lower likelihood to do so.

Message Characteristics

Given changes in social functioning and social expectations that individuals are suddenly experiencing, information related to the COVID-19 pandemic stemming from credible and reputable sources might be decisive in addressing public action. Therefore, understanding the types of messages as well as characteristics of messages is critical, given that, in certain crises, information access might make the difference between life and death (Zeng et al., 2016).

This gives rise to a series of questions, such as what are some of the barriers that arise based on mode of communication and how they are exacerbated by key features or characteristics used in messages. Studies (Nguyen et al., 2019; Ronen et al., 2019) have examined key differences across major modes of information dissemination: (i) text-based information and (ii) text-based information with accompanying graphics. The latter has been further categorized into data visualization, an innovative method for transmitting numeric and scientific information that is now widely adopted in a variety of areas and across disciplines, and interactive data visualization (IDV), which optimizes user experience and knowledge acquisition by translating large data information to lay audiences in innovative and accessible ways. Through the presentation of profuse data in a pictorial and/or graphical format, data visualization enables individuals to elaborate on information presented and, thereby, be able to grasp potentially difficult concepts (Cairo, 2012). IDV involves the use of visualized data (i.e., pictorial) with interactive features (i.e., click-events) which allow for presentation of more copious and robust data compared to static visualization. Further, information on IDV tools can be tailored to either show or hide information as needed, thereby facilitating and enhancing information processing, engagement, and knowledge acquisition, while reducing message resistance and overload (e.g., Ward et al., 2015; Yang, 2020). It is important to note that the inclusion of pictorials or visual alone does not enhance message efficacy. Merle et al. (2014) compared the efficacy of static versus dynamic infographics in online news. The authors found that individuals had a greater preference for static graphics, but that neither the presence of static nor dynamics impacted the perceived news value. Additionally, results indicated that individuals with higher levels of mathematical skills recalled information from the dynamic infographics at higher rates, suggesting the potential for issues of memory and/or cognitive overload among those with lower arithmetic aptitude. Taken together, these findings suggest the need for mindful use of visuals in order to have greater audience reach, particularly when communicating information to vulnerable populations, such as those with lower education levels.

Health risk messages may also present the potential for cognitive overload, especially in less educated groups. This could be mitigated through the use of IDVs as they allow for visual presentation of data and complex concepts, and they are thought to ease cognitive load (Yang, 2020). Further, because interactive visualization tools can be tailored to either show or hide information as needed, they may enhance information processing, engagement, and knowledge acquisition, while reducing message

resistance and overload (e.g., Sandouka, 2019). Yang (2017) examined the effectiveness of visual data tools on an individual's comprehension of HPV information and found significant differences in decision-making on HPV vaccination based on degree of visual information and interactivity features. In addition to these three message characteristics, health information messages will also be categorized as *high* or *low* information quantity. This will help assess when and how information overload presents. However, the type of information, its level of risk, and its format may play a role where research remains underexamined. There is some growth in the area of visual and mis/disinformation. In a recent study on visual elements of communication and COVID-19, Brennen et al. (2021) found that mislabeled visuals which accompanied misinformation served to emphasize the false arguments put forth in the communication pieces. Visuals often functioned as an extension of the misinformation, providing "evidence" claims. Findings from this study indicated a need for more research on the relationship between visuals and the spread of misinformation, particularly in times of crisis.

Information Overload. Information overload has been defined in multiple ways, with great variance in the literature on exactly what the construct represents (e.g., Bawden & Robinson, 2008). Some scholars (e.g., Yang et al., 2003) have focused on overload as a state in which the individual has difficulty in understanding information due to volume of information presented and/or in decision-making. Speier et al. (1999) further defined this as the condition in which amount of information exceeds the capacity for processing from of the receiver, and considered it a component of *information anxiety*. It is important to distinguish between information anxiety, a term coined by Wurman (1989) in his book *Information Anxiety*, and information overload, a construct developed by Toffler (1970). Although, known to date, no consensual definition of information anxiety exists in the literature, it is understood to be or include a state in which individuals are unable to effectively engage and apply information due to uncertainty with the information provided, whereas overload has a greater focus on the amount of information presented (Bawden & Robinson, 2008).

A recent study (Khaleel et al., 2020) found that although participants may initially desire greater amounts of health information—and this could be more salient in times of crisis such as a pandemic, over time, the amount could in fact exceed their processing capacity, which would lead to information overload. Understanding how an individual's desire for the most health information available and the amount of information an individual can process interact with each other and is essential to understanding message efficacy, and further to understanding factors that contribute to health behavior recommendation adherence.

Exactly how much information is too much information has been of interest to scholars for quite some time (Bergström, 1995; Lipowski, 1975). As previously suggested, the amount of information has been found to have an impact on more or less overload, particularly in messages with latent emotional narrative. Studies (Safran et al., 1986; Schachter, 1964) have found that the relationship between cognitive processing and emotional states is important given that when individuals process messages in states of increased arousal—also known as *hot cognition*—they are engaging from a place of attempting to regulate emotions and that there may be message and/or psychological reactance (defense reactivity). Conversely, cold or cool cognition centered on attention and memory tends to not be associated with emotional states and is most

often viewed as rational (Lazarus, 1999). While having the skills necessary to process emotionally charged messages effectively is key among some individuals and organizations (i.e., military), these are not optimal states for the majority of the population (National Research Council, 2015). A balance of cool and hot cognition may better serve individuals, particularly when engaging with health and risk information.

Moreover, this may lead to *hot decision-making*, or decision-making that is highly reliant on emotional states and reaction to emotion-evoking messages. Studies (Loewenstein, 2005; Nordgren et al., 2007) have found individuals operating from a "cold" state often underestimate how "hot" states could alter their attitudes and behaviors. Similarly, those operating from a "hot" state underestimate how their decisions are being influenced by their emotions, thus leading to an overreliance on the certainty and clarity of their decisions. Loewenstein (2005) found that when individuals engage in health decision-making, specifically cancer-related, from cold and/hot decision-making states, they were more/less likely to take health risks. While the argument here centers on intrapersonal or individual-level impact, this phenomenon has also been observed in interpersonal communication. This is important given the role of interpersonal and social network health information sharing among minorities, which will be discussed in future sections.

Beyond the amount of information, another problematic issue is that of how the delivery of information might not be helpful. Given the risk of information overload, the examination of central (thoughtful engagement with message) versus peripheral route processing (acceptance/rejection of message due to factors outside message characteristics) might be important. Going forward, specific features of messages, such as information sources, channels of communication, characteristics of messages, and amount of information shared, will be examined in order to establish how individuals prefer to receive crisis health-related information, if the current channels and characteristics of message are most appropriate and reduce message resistance, and if and when information overload occurs. In the following section, special attention will be brought to the channels of communication.

The *Where* of Communication

Scholars have found that often traditional media is unfortunately burdened with barriers such as scarcity of information, limited sources, and barriers to public access. Thus, one area that has emerged as critically important in public health is understanding the role of mis/disinformation. Although decreasing source and message credibility can be found across all traditional media channels (Allcott & Gentzkow, 2017), it has become particularly salient in mediated communication environments such as social networking sites/social media platforms (i.e., Twitter).

Digital Information Platform and the Rise of Mis/disinformation

Shao et al. (2018a) found that the increase of misinformation in mediated spaces has led to questions on the reliability of the current information ecosystems. To better understand this, and its impact on individuals in terms of attitude and behavioral outcomes, it is important to consider the distinction between misinformation and

disinformation as well as what forms of these are more prevalent in digital spaces. This information may better inform strategies for lessening potential harmful effects.

Misinformation. Misinformation refers to the process in which information is generated with the intent to mislead. Individuals are exposed to misinformation daily (Shao et al., 2016) as errors in messages can originate from transference (miscommunication) that is unintentional (Wu et al., 2016). In an attempt to share information, we may misremember and inadvertently give wrong information to someone. This is a critical component of misinformation—it can consist of the unintentional spread of wrongful information. Defining misinformation in this way allows us to understand why and how it is so prevalent in everyday communication. Although there could be intent, misinformation is not contingent upon intent to mislead—that is a characteristic more commonly associated with *disinformation*.

Disinformation. Disinformation refers to information/messages that are false and/or biased (Freelon & Wells, 2020). Similar to misinformation, disinformation involves the spread of false information; however, it is purposeful in that inaccurate information is spread intentionally. Disinformation can not only originate from individuals but also from organizations. Governmental agencies, for example, may introduce disinformation to purposefully mislead opposition (Freelon & Lokot, 2020). Another commonly used term today is "fake," more precisely "fake information" or "fake news." Concerns about the authenticity of information highlight the role of information in attitude and behavior adoption. As Southwell et al. (2019) states, "worries about blatantly 'fake' information imply an active and strategic presentation of falsehoods that threaten to have dramatic effects on public health" (p. 282). Furthermore, the authors (Southwell et al., 2019) argued that although important this should not distract from understanding systemic challenges that promote the "diffusion and adoption of misinformation rather than simply focusing on the elimination of problematic pieces of misinformation" (p. 282).

One critical aspect of misinformation and/or disinformation is its long-term effects. Studies (e.g., Zhu et al., 2012) found that even short or brief exposure to misinformation can lead to false memory, and that memory trace, or the process, did not differ significantly between true and false memories. Further, Ha et al. (2021) found that individuals are likely to sustain belief in false information even after incorrect information has been corrected or proven to be false. Continued Influence Effect (Johnson & Seifert, 1994), Worldview Backfire Effect (Cook & Lewandowsky, 2012), and Motivated Cognition (Kruglanski, 1996) provide theoretical support for why corrected information does not eliminate false information and/or why there may be resistance to accept corrected information (Ha et al., 2021).

Another important consideration is the spread of information due to artificial or digital tools. Today, there is evidence to support the use of social bots in the spread of information in mediated/online spaces. Current research (e.g., Shao et al., 2018b) suggests they are in fact disproportionately responsible for spreading information from low-credibility sources. Social bots, also referred as simply as "bots," are "software-controlled profiles or pages" (Shao et al., 2017, p. 2), charged with early diffusion of information that leads to message virality or significant uptake of messages on online platforms. Given the algorithms and machine learning embedded within bots, they are useful tools for targeting vulnerable individuals. As individuals engage with

bot-perpetuated content, by behaviors such as re-sharing, they contribute to increasing message reach (Shao et al., 2018b).

Social media is ripe for exploration given the presence of bots as well as the speed in which information is shared in these online spaces, especially during times of increased risk and crisis. Increased information access on social media also enables it to be an appropriate space for exploring the susceptibility of mis/disinformation (Huang et al., 2015). How individuals make sense of information found on social media—engage in *sensemaking*—is also useful in understanding how and when information overload might manifest. Sensemaking helps explain how individuals negotiate their experiences, attitudes, and behaviors (Wendorf Muhamad et al., 2019). At the individual level, sensemaking involves the rationalization of experiences by individuals through constructing narratives that they can understand (Maitlis & Christianson, 2014; Webb & Weick, 1979; Weick, Sutcliffe, & Obstfeld, 2005). When individuals are confronted with new, confusing, or surprising events, sensemaking can be activated (e.g., Maitlis & Christianson, 2014; Weick, Sutcliffe, & Obstfeld, 2005; Weick, 1995); crisis situations meet this criterion and usually invoke sensemaking (Livingston, 2016). Huang et al. (2015) suggested that sensemaking information found in mediated spaces during crisis may be an inevitable process due to not only mis/disinformation but also missing information (e.g., incomplete sources). Online health information has been found to be problematic with varying reliability, validity, and credibility, among other characteristics. Therefore, individuals are often left to discriminate value and truth of information on their own (Swire-Thompson & Lazer, 2020), highlighting the importance of the sensemaking process.

COVID-19 and Mis/disinformation

A study on misinformation on Twitter by Kouzy et al. (2020) found that a significant percentage of COVID-related information shared via tweets contained misinformation. Of 673 tweets related to COVID, the authors found that approximately 25% contained misinformation and about 20% had unverifiable information. Another recent study on misinformation and COVID-19 (Memon & Carley, 2020) found that individuals organize into misinformation communities, and that these have greater density and have a greater degree of structure and organization than informed communities. This organization then leads to higher volume of information produced and shared, as well as an increased rate of information sharing. From their analysis, Memon and Carley (2020) have identified anti-vaxxers, or vaccine-hesitant communities, as significant misinformed communities. This will be an important community to monitor, as developing prevention treatments to COVID-19 include vaccination.

Health and Risk-related Communication and Vulnerable Populations

Vulnerable populations—individuals with disabilities (i.e., non-neurotypical individuals), minorities, aging adults, among others—are disproportionately affected by lack of resources (e.g., education) that may be necessary for health crisis information processing. Minorities are at greater risk of contracting the virus, have less access to healthcare, and experience higher comorbidity rates that may lead to higher death rates than

other groups (Tai et al., 2020). Therefore, examining the relationship between competing health information, adherence/intention to comply, and how features of a message (e.g., delivery channel and amount of information introduced) interact with individual differences prevalent in vulnerable populations (i.e., lesser educational resources) might be crucial to understanding how these influence cognitive processing, message acceptance/reactance, and behavioral intentions. Additionally, understanding how these factors could delay adoption of recommended health behaviors is critically important. Health mis/disinformation and information overload in times of crises (pandemic) and the impact on vulnerable populations are also relevant areas of exploration for equitable health and risk information access.

As previously discussed, one potential negative outcome of this scarcity, especially in a time of crisis, is information overload, or the lack of retention of important information. This is particularly salient during a crisis when information presented occurs with higher frequency, across multiple channels, and with varying text and visual communication characteristics. For vulnerable populations, not only is the amount of crisis-related information potentially problematic but also the manner in which it is presented may lead to information overload and/or resistance to message processing as this can impact adherence and/or compliance behaviors that are critical during a health crisis. A salient question that emerges is: what are the barriers to message processing, and could the message itself be a barrier to adherence to recommendations? Equally important is understanding if vulnerable populations are at higher risk for information overload and the role of mis/disinformation during times of a health crisis. Is overload, confounded by mis/disinformation, heightened during times of increased risk, and moreover, do these lead to greater harm for vulnerable populations who are already at higher risk?

Information Overload, and Hypervulnerability

There is ample evidence for a linkage between health literacy and health outcomes (e.g., Sentell & Braun, 2012). Unfortunately, vulnerable populations such as the socioeconomically disadvantaged, racial/ethnic minorities, the elderly, and individuals with disabilities are disproportionately affected during a public health crisis (CDC, 2020b). Research examining interactions across population groups and information environments is needed to fill a gap in scholarship on effectiveness of public health crisis messaging (Savoia et al., 2013). Determining message features that increase thoughtful engagement with the message, reduce the potential for information overload, and decrease rejection of the message based on features rather than the information itself is critical to understanding factors that contribute to health behavior recommendation adherence.

Of particular emphasis has been the impact of COVID-19 on racial and ethnic minorities given the disparate health conditions. For Latino/a populations, impacted by lower socio-economic social status, health insurance or healthcare coverage has been found to be significantly limited (e.g., Knipper et al., 2019). This reduced access to healthcare professionals, along with excessive and/or misleading information, can lead to detrimental health outcomes. In the context of minorities, particularly Latino/as in the United States, media ecologies, such as health media ecologies, are important because they establish the connection between the individual and the health

information in a system in which individuals often lack access to healthcare resources and professionals. The lack of access faced by Latino/as in the United States leads to gaps in knowledge that may be filled by information provided by these connections—family, friends, religious groups, television, and others. This is critically important given that Latino/as experience higher rates of preventable disease and chronic conditions compared to the general population (Perez-Escamilla, 2011). To explore this, Katz et al. (2012) conducted a study in which they examined the role of health connections, or components of an individual's media ecology, and the elimination of health knowledge and/or information gaps due to lack of access to healthcare resources and medical professionals. The authors found that individuals with documented legal status and higher levels of income, education, and language proficiency had more diverse informal health communication ecologies. These informal health communication ecologies were also found to have a relationship with healthcare access (including healthcare coverage) and enhanced health outcomes (Katz et al., 2012). Results from Katz et al.'s (2012) study found that factors like socio-economic status and other factors such as limited education and being foreign born among others among Latino/as predicted lower *informal health communication ecology index* (IHCEI) scores. According to this finding, informal health communication ecologies among Latino/as are linked to status, which is also linked to health and medical access (Katz et al., 2012). IHCEI is a six-item index which was designed in order to measure the range of communication channels that individuals might connect with informally for health information (Katz et al., 2012). The IHCEI might present a broader understanding of the ways that individuals engage with health information.

Other studies (e.g., Walter et al., 2018) have found that communication and media ecologies have distinctions that vary across communities, in particular communities of color, and that these differences have an impact on prevalence and salience of health issues and perceptions. Lane (2019) suggested that for Black and Latino communities, their communication ecologies center on interpersonal resources. These interpersonal resources become an influential form of information acquisition and hold the potential to perpetuate incorrect information if shared within the network. As Yang et al. (2017) found, individual differences may predict information-seeking behaviors. The authors proposed and tested a conceptual model that suggests higher social support from family (interpersonal network) and predicted higher trust in health information shared by a family member. Culture plays a significant role in information sharing, with certain cultural groups valuing informal communication networks more than others. Matthews et al. (2002) found that among Black cancer patients, there was a stronger use of word-of-mouth for information sharing. Similar studies have found this pattern among other minority populations, for example, Somali Americans (Bahta & Ashkir, 2015) and MMR vaccine-hesitancy and Latinas and sexual health (Cashman et al., 2011).

Building and maintaining trust remains indeed the fundamental factor central to how public health messages are heard and accepted (Vaughan & Tinker, 2009). Considering that trust is dependent on prior experiences and shared knowledge as well as consistent communication, it can quickly become an elusive piece to the winning risk communication strategy playbook. In fact, studies conducted after Hurricane Katrina demonstrated the importance of community-based communication specifically because of higher trust levels (Eisenman et al., 2007). That work also underlined

the need to educate the population, as results showed that participants could distinguish between a category 3 and category 4 hurricane. Such evidence indicates that a communication strategy must encompass education plans. For crisis related to hurricane and tornados, information related to the ranking of strengths and aspects that demand urgent reaction and caution are essential components of increasing perceived risk (Eisenman et al., 2007). Similarly, for pandemic, the understanding of specific symptoms might increase issue salience, which might lead to adoption of preventive behaviors.

Mis/disinformation and Vulnerability

Current research suggests that susceptibility to misinformation has been linked to context and sociodemographic characteristics, although it can be a significant predictor, alone does not explicate misinformation vulnerability. For example, Sylvia Chou et al. (2020) found that a higher level of education did not prevent misinformation vulnerability among individuals. However, this does not mean that higher educational attainment never impacts information processing. A study by Seo et al. (2020) found that individuals with higher education scores were able to more accurately assess information credibility when presented with information. The authors (Seo et al., 2020) noted that individuals were not only likely to better assess credibility but they were also better at evaluating the source of information, specially author and channel and/or mode of communication (i.e., website).

DiFonzo et al. (2014) suggested that information networks, along with ingroup attitudes, are often the source of health misinformation among individuals or communities with a history of medical mistrust. Narratives of conspiracy theories, such as the HIV/AIDS conspiracy narrative among Black communities, lead to what Jaiswal et al. (2020) called "inequality-driven mistrust" (p. 1). This is further perpetuated by misleading information such as rumors that quickly disseminate through racial or ethnic culture groups/communities or "trust and knowledge networks" (Heller, 2015, p. 43). Beyond conspiracy narratives, there is ample evidence and historical context to understand medical mistrust on behalf of minority populations. The harvesting of cells from Henrietta Lacks without medical consent (Truog et al., 2012), the Tuskegee Syphilis Experiment performed on African Americans (Lombardo & Dorr, 2006), and the Four-H Club (e.g., Fouron, 2013) narrative driven in the 1980s in the United States by the Center for Disease Control asserting that Haitian ancestry was a risk factor for AIDS, have all contributed to this mistrust.

Multiple scholars agree on the importance of credible information sources (Crouse Quinn, 2008; Vaughan & Tinker, 2009). The current disproportional effects of COVID-19 on minorities warrant specific attention to ongoing discussions related to crisis and risk communication strategies for vulnerable populations. Existing literature focused on the influenza previously addressed such a relationship (Crouse Quinn, 2008). It appears evident that high mistrust most notably in governmental agencies would act as a leading cause for reduced engagement with crisis responses messages (Reynolds, 2007). The CDC has long focused its work on implementing procedures based on three distinct phases of a crisis: (i) pre-crisis, (ii) during, and (iii) post. The general emphasis of their strategic communication approach is the prevalence of consorted efforts

between trusted community partners, who can determine both appropriate channels, and spokespersons.

In order for public health campaigns in times of crisis and increased risk to reach these populations, the complexity of mistrust must be acknowledged and considered when planning interventions. This is crucial given that health information is essential for informed decision-making and the aforementioned hot/cold cognitions impact on message processing. Moreover, health misinformation has been found to lead to incorrect perceptions of health issues (Barua et al., 2020), which may impact perceived susceptibility and severity of health concern. Factual knowledge, as defined by Plutzer (2013), focused on knowledge and confidence in science information. Given that racial and ethnic minorities report less medical and science trust, as well as report lower scores of health literacy, addressing health and risk communication is critical for this population as it perpetuates what Plutzer (2013) coined *the racial gap in confidence in science*. This gap in knowledge and focused studies on racial disparities has been noted by the recent National Academies of Science, Engineering, and Medicine (NASEM, 2016) report on science literacy. NASEM (2016) found that although differences in knowledge scores are often noted (e.g., Pew Research Center reports), factors that contribute to these differences between racial groups is often overlooked. Although the report focused on science, health information can be considered as a science and evidence-based area of study. Furthermore, although the focus here has been on vulnerable populations in the United States, it is important to consider how this information can be applied to a broader context. Green and Merle (2013) examined studies of death in US-based news via terror management theory (TMT) which posits that cultural orientation influences mortality salience. Authors found that differences in culture worldwide, particularly collectivism versus individualism, predicted civic engagement intentions (Green & Merle, 2013). Findings from this study parallel to the current pandemic given COVID-19 is often framed in terms of life or death, as well as in public health campaigns that have presented mask-wearing (a prevention behavior) in terms of social and civic responsibility. Additionally, it highlights how individuals with varying cultural background may be more or less responsive to messages that highlight the salience of mortality which is critical in applied health communication campaigns.

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6

Social Media, Risk Perceptions Related to COVID-19, and Health Outcomes

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Between January and April 2020, COVID-19 rapidly spread from its origin in Wuhan, China, to over 100 countries, and all 50 states in the United States, public health officials and governments around the world, and the World Health Organization (WHO) have attempted to reduce the spread of disease by raising awareness of the disease and encouraging protective behaviors such as social distancing, wearing face masks, hand washing, and seeking medical attention if experiencing symptoms of the disease. At the time of writing this chapter, there were 20.6 million COVID-19 cases worldwide, and the death toll from COVID-19 was 7,490,000 worldwide and 167,000 in the United States.

As COVID-19 continues to spread in the United States and around the world, it has become increasingly important to understand public risk perceptions (Van Bavel et al., 2020). Moreover, many people are experiencing mental health problems, such as stress and depression, related to COVID-19 due to the fear of contracting the virus itself as well as the steps public health officials and governments have taken to mitigate the spread of the disease (e.g., shelter-in-place orders, travel restrictions, quarantine requirements, and many other changes in day-to-day life) (Van Bavel et al., 2020). People's risk perceptions are strongly influenced by traditional news media and information on social media about the spread of COVID-19, hospitalizations, death rates, and other complications caused by the virus. When individuals encounter such news and information about pandemics like COVID-19, it can amplify risk perceptions for contracting the virus. At the time of this writing, no COVID-19 vaccine is available, and individuals need to be aware of the potential risks of contracting COVID-19 as well as steps they can take to reduce exposure and spread of the virus in their daily lives.

Social media have become an increasingly important source for information in terms of health and crisis communication (Austin et al., 2012; Cho et al., 2013; X. Lin et al., 2016). Social media function as a convenient source of information in crisis situations (Cheng, 2018; Xu, 2020). Social media platforms, such as Facebook, Twitter, Instagram, and YouTube, have accelerated the speed of information transmission in crisis contexts has across social, cultural, and geographical boundaries (Eriksson, 2018; Xu, 2020). Real-time information exchange through various social media platforms can facilitate the wider diffusion of risk information not only for people's

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online friends and family members but also for larger online communities. Social media platforms have seen a 61% increase in usage during the COVID-19 pandemic as people use the platforms to stay connected with family, friends, and colleagues (Holmes et al., 2020). Individuals appear to be using social media to compensate for face-to-face social network interaction. Previous studies have found that people use social media to seek and interpret information about crisis situations as well as a way to share information with members of their social networks (Austin et al., 2012; Wang & Dong, 2017). Moreover, in terms of COVID-19 specifically, people often use the information about COVID-19 they encounter on social media to assess their susceptibility to contracting the virus, the severity of the disease, and steps they can take to minimize risk for themselves and loved ones (Nabity-Grover et al., 2020).

People often use social media platforms for daily communication with people in a close-knit social network (strong ties) (Wright & Miller, 2010). However, individuals are also exposed to social media comments, exchanges, etc. from weaker ties, ranging from friends of friends/family to complete strangers (Wright & Miller, 2010). Information shared and exchanged on social media might be more convincing for behavioral change because they likely include more personal narratives and experiences than traditional mass media channels (Yang et al., 2010). People often read comments from others on social media on a daily basis about COVID-19 risks (Allington et al., 2020). These comments may vary in terms of accuracy and credibility and can lead to inaccurate predictions about one's risk for contracting COVID-19. As a result, the social norms and beliefs that people encounter when communicating with others on social media may influence their behavior and ultimately the spread of a pandemic (Van Bavel et al., 2020). In addition, social media use and attention to the comments and stories of network members may increase preventive behaviors regarding COVID-19, and using these platforms can also lead to information avoidance and maladaptive behaviors to cope with the fear of the disease (Liu, 2020; Pennycook et al., 2020).

This chapter examines the associations among exposure to COVID-19-related information on social media, risk perceptions, and health attitudes, beliefs, and behaviors. Toward that end, the chapter examines the relationship between social media use and risk perceptions regarding COVID-19, how misinformation about COVID-19 that people encounter on social media can influence risk perceptions, as well as ways in which public health agencies have used social media to counter misinformation and track health beliefs, attitudes, and behaviors and the effects of social media use during the COVID-19 pandemic and health behaviors and outcomes. This is followed by a section that discusses a number of health communication theoretical frameworks that may help to shed light on social media use and risk perceptions in the context of the COVID-19 pandemic. Finally, the chapter concludes with a discussion of potential future directions for research in the context of COVID-19 and risk perceptions.

COVID-19 Information on Social Media and Risk Perceptions

Risk perceptions are known to be important determinants of an individual's willingness to adopt health-protective behaviors during pandemics similar to COVID-19, including frequent hand washing, physical distancing, avoiding public places, and wearing face masks (Poletti et al., 2011; Rudisill, 2013). Perceived risk refers to an

individual's belief of vulnerability to a particular risk while perceived susceptibility refers to beliefs about the likelihood of experiencing an illness (Cho et al., 2013). In general, the greater the risk an individual perceives, the more motivated they should be to engage in protective behaviors. However, risk perceptions of pandemics are influenced by a variety of social, cultural, and contextual factors (Abdulkareem et al., 2020; Dryhurst et al., 2020; Leppin & Aro, 2009). In the case of COVID-19, characteristics of one's social media network members, including race/ethnicity, political beliefs, occupation, region, etc., may influence the types of information on the virus that people encounter. For example, people who live in rural areas may feel less susceptible to the disease than those who live in crowded cities. Political beliefs may intersect with beliefs about the value of preventive measures (e.g., such as debates over the value of facemasks) (Painter & Qiu, 2020). Moreover, some social media network members may push conspiracy theories and other misinformation about the virus (Ahmed et al., 2020; Allington et al., 2020). In short, risk perceptions regarding one's susceptibility to COVID-19 as well as perceptions regarding the nature and the severity of the virus may be influenced in a variety of ways via comments and conversations with online social media network members.

In general, compared to other risk contexts, much less is known about how people perceive risks associated with emerging infectious diseases like COVID-19 (de Zwart et al., 2009). Most of the research on risk perceptions related to emerging infectious diseases has come from studies of previous pandemics, such as the H1N1 swine flu pandemic in 2009 (e.g., Fischhoff et al., 2018; Rudisill, 2013), the Ebola outbreak (Prati & Pietrantoni, 2016; Yang & Chu, 2018), and the SARS and Avian influenza (bird flu) epidemics (Leppin & Aro, 2009). Effective risk communication is important for addressing public fear, promoting risk awareness, empowering the public in taking protective actions, and gaining public confidence and trust (Covello, 2010; Sellnow & Seeger, 2013; Wardman, 2014). While risk communication theories and models have been developed since these earlier pandemics, factors such as the rapid spread of COVID-19 through social contact; unknown and quickly developing research surrounding the nature of the virus; the increase of social media use due to social distancing practices during the pandemic; and the current social, cultural, and political climate have had a large impact on public risk perceptions (Ahmed et al., 2020; Llewellyn, 2020; Painter & Qiu, 2020).

Assessing accurate public risk perceptions is critical to effectively managing public health risks. During a health crisis, the public depends on the media to convey accurate and up-to-date information that allow people to make informed decisions regarding health protective behaviors. During times of uncertainty and crisis, the public may increase their reliance on the media (Ball-Rokeach & DeFleur, 1976), and it is important that trusted sources are available to provide risk assessments and recommendations (Lachlan et al., 2016). Individuals tend to form accurate perceptions of risk when empirical facts about a pandemic are known, understandable, and communicated to the public effectively via the media (Fischhoff et al., 2018). When information about a public health threat is not known, well-understood, or ineffectively communicated to the public, ambiguity can lead to heightened appraisals of threat. These phenomena are particularly relevant to the COVID-19 pandemic, as people tend to perceive novel viral threats as higher in risk compared to more common threats such as influenza (Hong & Collins, 2006). Individuals are often overwhelmed

by the amount of information about health crises that is available to them via social media. Moreover, individuals as well as their social media network members vary in terms of health and scientific literacy (X. Chen et al., 2018), which may influence their interpretation of COVID-19 scientific evidence, the severity or the pandemic, and the need to take certain preventive measures. This may lead to increased uncertainty about evidence-based information and risk perceptions related to COVID-19. New scientific discoveries regarding COVID-19 and public health expert opinions and recommendations regarding the nature of the virus or how to best avoid it often change, which may lead to confusion or mistrust of experts. Scientific facts about COVID-19 may be intertwined with misinformation within comments and conversations with social media network members, and this may make it challenging for people to decipher truth from fiction regarding information about the virus itself or the course of the pandemic.

Accurate perceptions of personal risk during a pandemic are essential to influencing risk-prevention behaviors that may help reduce infection (Brawarsky et al., 2018; Ibuka et al., 2010). Studies have found that perceived personal risk of infection and health effects are linked to protective behaviors during pandemics (Ibuka et al., 2010; Moran & Del Valle, 2016). However, people typically tend to underestimate their likelihood of experiencing adverse life events (such as cancer) relative to the average person (Keller et al., 2006; Ornell et al., 2020). Although people tend to perceive novel health-related threats as higher in risk compared to more common threats such as influenza (Hong & Collins, 2006), they often exhibit optimism bias. Optimism bias is associated with the belief that we are less likely to acquire a disease than others, and it has been shown across a variety of diseases, such as cancer, heart disease, and other diseases, including COVID-19 (Costa-Font et al., 2009; Halpern et al., 2020; Van Bavel et al., 2020). Conversely, mortality risks that are perceived to be uncontrollable have been found to discourage health promoting behaviors (Ferrer & Klein, 2015). There is often a large "perception gap" between perceived and objectively calculated risks (Cainzos-Achirica & Blaha, 2015). In many cases, health protection behaviors may be motivated more by perceived risk than the actual prevalence of risk (Raude et al., 2018). Actual mortality risk of COVID-19 is associated with age, with the elderly being at greater risk of dying due to COVID-19 (Dowd et al., 2020). In addition, there are socioeconomic inequalities in the transmission of COVID-19 that have led to greater risk for the disease among certain groups, including lower socioeconomic status (SES) and minority communities.

Furthermore, there are occupational inequalities with respect to COVID-19-related risk, including healthcare workers, food processing workers, and a variety of other occupations that are at risk for higher overall levels of exposure to COVID-19. These problems have been exacerbated by the unavailability of personal protection equipment (PPE) that have left many workers without adequate protection for the disease (Agius, 2020). The unequal distribution of risk across societies appears to impact reported differences in perceptions of risk experienced by certain groups (Abel, 2008; Bolte et al., 2010). Understanding information-seeking behaviors during the outbreak of COVID-19 may also provide some insight into the differences on how people are experiencing the pandemic. Previous research suggests that there are demographic differences in health information behaviors, especially with respect to age and SES. Both age and higher SES are predictors of increased use of social media as a source of

health information, as opposed to traditional media (Jacobs et al., 2017; Kontos et al., 2014). In short, it is apparent that perceived risk affects individuals' protective behavior during a pandemic, but that individuals may vary widely in terms of their risk perceptions due to many social, cultural, and demographic factors.

Social Media Use, COVID-19 Misinformation, and Risk Perceptions

Misinformation about COVID-19. Social media use may lead to both positive and negative outcomes during a pandemic. While social media can help facilitate the spread of public awareness, information, and attitudes toward control and preventive measures during a pandemic, they can also lead to negative emotional responses/behaviors and misinformation (Chou et al., 2018; Wang et al., 2019; Waszak et al., 2018). Although social media platforms like Twitter and Instagram may be less likely to expose individuals to graphic images compared to television, leading to fewer negative emotional responses or coping behaviors (Jones et al., 2016), they also provide direct access to a large amount of content that may amplify rumors and questionable information. Previous studies have found YouTube and Facebook are social media platforms linked to the dissemination of conspiracy beliefs and misinformation on medical and other topics (Bora et al., 2018). Misinformation can spread through social media very quickly and can heighten perceived risk and fear about health-related topics (Ng et al., 2018; Wang et al., 2019).

Social media has been criticized during the COVID-19 pandemic as a medium for the rapid spread of fake news. Spending excessive time searching for COVID-19 news on social media has also been linked to emotional contagion through online social networks (Ni et al., 2020). Social media may lead to information overload, which in turn may cause mental health problems. Scholars have recently called for more research that may help us understand the underlying drivers of fear, anxiety, and stigma that fuel misinformation and rumor on social media (see Holmes et al., 2020; Khan et al., 2020). Since the onset of the COVID-19 pandemic, disinformation and false reports about the COVID-19 have appeared on social media, which have led to outcomes that range from increased anxiety and fear on one extreme to disregarding the threat on the other (Nguyen & Nguyen, 2020). The spread of misinformation on social media may confuse people, harm people's mental health in cases where it increases anxiety or leads them to avoid information that is too threatening to process. Studies have found that exposure to large amounts of information regarding a health crisis can also lead to media fatigue causing relaxation of healthy behaviors essential to protect individuals (Cohen et al., 2013). Inaccurate messages are often shared more frequently on social media than accurate messages due to high levels of emotional content and vividness within them (Vosoughi et al., 2018), and the presence of conflicting messages in one's social feed makes it more difficult for an individual to distinguish the credible from the non-credible (Karduni et al., 2018).

Also, misinformation about COVID-19 can shift attention from healthy behaviors (such as hand washing, social distancing, etc.) and promoting erroneous practices that can harm health in other ways (e.g., such as claims that the drug hydroxychloroquine can protect people from COVID-19). Misinformation about COVID-19 only affecting older people or those with underlying health conditions can increase the spread of the virus when people feel that they are less likely to contract the virus or infect others.

Most disturbing is the proliferation of conspiracy theories on social media that claim COVID-19 does not really exist. A number of studies have found a link between medical conspiracy beliefs and reluctance to engage in a variety of health-protective behaviors, such as vaccination, certain medications, and safe sex (Oliver & Wood, 2014; Waszak et al., 2018).

Countering Misinformation and Tracking COVID-19 Cognitions and Behaviors

Public health researchers have used social media platforms like Facebook, Twitter, and YouTube to post regular updates about COVID-19 with links to official pages in an effort to counter misinformation and disseminate evidence-based information about the virus (Chou et al., 2018; Miller et al., 2020). However, since members of the public often respond to these updates through comments posted on various social media platforms, people have the ability to post content and links to websites or "news" stories that undermine the information from these sources. The widespread shelter-in-place orders that require or encourage people to stay at home have resulted in more time being spent on social media, including searching for news or information about COVID-19 (Allington et al., 2020).

Yet, social media also allows public health agencies to monitor the public's communication framing of COVID-19 on social media. This may provide insights into the public's risk perceptions. Researchers can use social media platforms to accelerate data collection from large online surveys, message content in comments and conversations, and information from user accounts to access important demographic data and GPS location to assess movement patterns during lockdowns (Chen et al., 2020). Analyzing user content through programs such as Python and tracking information usage patterns, such as users' browsing, searching, sharing of information, and other forms of online engagement (e.g., liking or disliking), can provide researchers with important insights into the public's attitudes, beliefs, and health-related behaviors regarding COVID-19 (Li et al., 2020; Rovetta & Bhagavathula, 2020). Computer analytics programs can facilitate data analysis of "big data" on social media in ways that are unobtrusive to users (Galetsi et al., 2020). While public health agency efforts to fact check and disseminate evidence-based information about health issues can correct individuals' misperceptions, studies from political communication and social psychology have found that efforts to correct misinformation may be limited in contexts where people are motivated to defend their pre-existing beliefs (Scheufele & Krause, 2019).

Health Behaviors and Outcomes Related to Social Media Use during COVID-19

During the past decade, studies have demonstrated that both the type and amount of media exposure affect psychological and behavioral responses to a community-wide traumatic event (Garfin et al., 2015; Thompson et al., 2019). However, less is known about the mental health consequences of the COVID-19 pandemic and social media use during the pandemic. Social media could mitigate the mental health impact of COVID-19 and lockdowns by maintaining social ties and social support during physical distancing, as well as providing information and resources that can help

individuals cope with the pandemic online (e.g., such as support groups or psychological counseling) (Gao et al., 2020; Lin, 2020; Ye et al., 2020). Living in a state of having a sustained, heightened stress response due to an ongoing pandemic like COVID-19 also has implications for long-term well-being (Gao et al., 2020). Acute stress responses to trauma have been linked to several long-term health outcomes, including cardiovascular disease, lower self-reported general health, global distress, depression, and anxiety disorders (Ahmad & Murad, 2020; Gao et al., 2020).

Assessing the relationship between social media use and health behaviors related to COVID-19 prevention can be challenging for a variety of reasons. First, it can difficult to tease out the influence of social media content and interactions from other sources of information about COVID-19, including traditional media (i.e., television, newspapers, and radio) and face-to-face interactions with social network members (Rice, 1999). Individual-level behaviors during pandemics are a result of both voluntary and government-enforced behavioral change. Adhering to shelter-in-place orders or wearing face masks may be motivated by fear of breaking the law more than personal beliefs about the risk of contracting COVID-19.

Second, determining the role of the social media in terms of influencing health behaviors during a pandemic is complex. Social media platforms contain a variety of information sources and social media through which people acquire knowledge and communicate with others. There is a large amount of variance in terms of people's preferred social media platform choice for obtaining information about COVID-19 and other health information (Chou, Oh, & Klein, 2018). In recent years, social media companies have increasingly tailored information on social media platforms in terms of links to news stories, etc. based on past use of search engines and social media platforms using data tracking/mining programs that help these companies personalize content for users. For example, social media data have allowed marketers to serve targeted advertisements based on interests and online sharing behaviors (Chou et al., 2018; Minton et al., 2012). This can contribute to some groups of people receiving better and more accurate information regarding COVID-19 than other groups (Gupta, Tyagi, & Sharma, 2013).

Third, people vary in terms of the amount of information-seeking they engage in on social media. Individuals who are experiencing high levels of uncertainty and anxiety in terms of health situations have been found to engage in greater amount of information-seeking than people with less uncertainty and anxiety (Lin et al., 2016; Rosen & Knäuper, 2009). When people continuously search for updated information regarding a pandemic like COVID-19 and when the amount of information exceeds one's processing capacities, this can lead to information overload. Information overload may reduce self-efficacy as well as response efficacy in health situations (Vraga & Jacobsen, 2020; Yan et al., 2016), which can influence the degree to which people adopt self-protective behaviors during a pandemic (Vraga & Jacobsen, 2020). Within health contexts, self-efficacy is often defined as an individual's beliefs in their capabilities to influence a situation as well as behavioral skills of a person (Schwarzer & Renner, 2000; Strecher et al., 1986). Response efficacy refers to the perception of one's capability of being able to respond to a threat or crisis situation (Strecher et al., 1986). In the context of COVID-19, response efficacy consists of the ability to engage in protective behaviors, such as social distancing, self-isolation (if they have traveled or potentially been exposed to the virus), or the ability to consistently wear a face

mask. Some individuals may evaluate the efficacy of some responses to COVID-19 more negatively than others. In recent months, we have seen people challenge certain responses to self-protective behaviors regarding COVID-19 based on social factors, including cognitions that have been shaped by the influence of political communication (e.g., the belief that "President Trump and 'real' conservatives don't wear face masks," etc.).

In short, there are multiple factors to consider when attempting to study the influence of social media content and conversations on individual health behavior (Seymour et al., 2015; Vraga & Bode, 2017; Wang et al., 2019). The complexity of studying such influences has become more challenging in the era of fake news and "alternative facts" that are promoted on traditional media as well as social media. The sheer number of social media platforms and sources of information make it difficult for researchers to pinpoint if or where a person may have encountered specific types of correct or misinformation regarding COVID-19 (Allington et al., 2020; Pennycook et al., 2020). Content analysis studies may show that certain social media platforms contain correct or incorrect facts about COVID-19, but such studies do not allow researchers to make claims about the influence of such content on self-protective behaviors. What we know about COVID-19 changes daily as new studies and information emerge, and this information is often politicized or undermined by people through comments on social media.

Theoretical Frameworks for Studying Social Media and Risk Perceptions

This section examines four theoretical frameworks that may be particularly useful to apply to the study of social media and risk perceptions within the context of social media use and the COVID-19 pandemic. Of course, a discussion on all theories and models that could be used to study health communication issues within this context is beyond the scope of this chapter. The following subsections will briefly describe the theories/models and their relevance to the study of COVID-19 risk perceptions along with some of their key limitations.

The Health Belief Model (HBM)

The Health Belief Model (HBM) has been widely used as a conceptual framework in behavioral research to understand the health behavior of individuals (Rosenstock, 1974; Strecher & Rosenstock, 1997). The HMB posits that risk perceptions, including perceived benefits and barriers of adopting certain protective behaviors, contribute to people's willingness to make behavioral changes (Strecher & Rosenstock, 1997). The HBM consists of six components: (i) *perceived susceptibility* refers to an individual's perception of the threat occurring, (ii) *perceived severity* refers to an understanding of the seriousness of a health situation or threat, (iii) *perceived benefit* is the manner in which an individual perceives that a recommended action would reduce the risk of a health threat, (iv) *perceived barriers* are the impediments to adopting recommended behavior, (v) *cue to action* is a trigger for prompting engagement in health promoting

behavior, and (vi) *self-efficacy* is the perceived ability to perform the recommended action (Strecher & Rosenstock, 1997).

In the context of COVID-19 prevention behaviors, it may mean reminding patients standing in line in public settings to practice social distancing or advising patients who exhibit symptoms of COVID-19 to self-quarantine for the length of time suggested by physicians. Perceived barriers in the HBM are things that the individual feels may prevent them from making the desired behavior change. In general, as perceived barriers increase, the individual's likelihood to engage with the behavior decreases. Finally, self-efficacy explains how predisposed an individual is to respond to cues to action based on the value of their health. The HBM has been used to study the health beliefs of the public on social media (Lwin et al., 2020; Tan & Wee, 2020). In the context of the COVID-19 pandemic, the HBM can be used to assess the influence of social media messages and interactions related to COVID-19 on self-protective health behaviors (Raamkumar et al., 2020). These messages and interactions are more likely to influence an individual's health behaviors if they address the various components of the model (e.g., perceived barriers, benefits, self-efficacy, and threat level). However, researchers should also be aware of the limitations of the HBM for studying the complexity of pandemics like COVID-19. For example, the HBM does not directly incorporate constructs such as social norms and cultural beliefs. Instead, researchers tend to measure and account for the influence of such variables indirectly through the use of exogenous variables such as demographics (Raamkumar et al., 2020).

Extended Parallel Process Model

Another framework that may be useful in terms of studying risk perceptions of COVID-19 and social media use is the Extended Parallel Process Model (EPPM) (Witte, 1994). According to EPPM, when people are exposed to a risky situation, they produce two cognitive appraisals: (i) appraisals of the threat itself and (ii) efficacy of the recommended response to the threat (Witte, 1994). The EPPM, therefore, indicates that the perception of risk would act together with self-efficacy levels for prevention. The EPPM can be used to assess risks associated with the COVID-19 pandemic, how people are assessing these risks, and how such assessments lead to them changing their behaviors in order to follow COVID-19 health recommendations. Based on their level of perceived efficacy, people have two responses: those who perceive the responses to have high levels of efficacy are motivated to protect themselves by controlling the threat of COVID-19 and those who perceive low levels of efficacy and use psychological defense to control their fear. Individual's self-efficacy belief is a key factor along with perceived risk in terms of driving behavioral changes.

A number of studies have examined the role of perceived risk and efficacy belief on health behaviors during pandemics and other crisis situations (Balicer et al., 2010; Barnett et al., 2014; von Gottberg et al., 2016). Individuals usually use psychological defense strategies to control their fears (Lewis et al., 2013). These strategies include denial, avoidance, and reactance. Within the context of COVID-19, avoidance behaviors may include selective exposure when encountering content or conversations about COVID-19 that make a person feel uncomfortable (i.e., when it provokes feelings of fear), which may prompt a person to switch to another social media platform or traditional media source.

The EPPM may be a helpful framework for researchers to explore the cognitive and emotional mechanisms underlying acceptance or rejection of COVID-19 prevention messages on social media. In public health campaigns, the use of the fear appeals in the form of threatening health messages and is commonly used as a strategy for health promotion, disease prevention, and adoption of behavior within a population (Brown & Whiting, 2014). This tactic involves using images or messages to elicit negative emotions such as anxiety in the expectation that the target audience will be motivated to adopt the recommended health behaviors (Brown & Whiting, 2014). However, fear appeals may have negative consequences for recipients with low self-efficacy, as the message may strengthen the recipient's belief that they cannot avoid health threats (Tannenbaum et al., 2015). In addition, the fear appeal may psychologically reduce the evoked fear by opposing the message. Such defense mechanisms can make the recipient deny the message by viewing it as not true. This mechanism results in the fear diminishing and the message not being taken seriously (Lewis et al., 2013). Furthermore, Shen and Dillard (2014) found that people who experience the highest degree of fear are the same persons who will most likely reject the message.

Social Amplification of Risk Framework

Kasperson et al. (1988) developed the Social Amplification of Risk Framework (SARF). Although the SARF framework was developed before the advent of social media, its theoretical propositions provide a helpful framework for the analysis of health risk messages and how they are spread on social media. Social media appear to be unique channels that can be used for disseminating health information to diverse audiences and facilitating active communication about health topics among online social media network members (Moorhead et al., 2013; Neiger et al., 2012). Strekalova and Krieger (2017) viewed the communication of health risk on social media as an interactive phenomenon in which individuals transmit personally salient information while amplifying signals that support their views and attenuating those that do not. Amplification of risks in social media can be found in online behaviors such as sharing and liking comments, by providing additional comment, and signal sharing. Signal sharing within social media interactions can take the form of repeating technical, probability-related words used by professional sources, or when users create their own signals around the topics of health risk. Once messages are sent via social media platforms, the original message is typically liked, disliked, forwarded, and/or embellished to some degree in ways that the original sender can no longer control them (Shi et al., 2018; Yoo et al., 2018). All of these activities may promote engagement with and the visibility of a health issue in ways that would be difficult to achieve through the use of traditional media channels (Shi et al., 2018).

Risks are amplified or attenuated through the media via different social amplification contexts, which can range from individuals to the news media. Amplification happens in two stages: in the initial transfer of information about the risk and in the response mechanisms in society (Strekalova & Krieger, 2017). It is through these amplification processes that public perceptions of risks are shaped. These amplifications are especially relevant in cases where first-hand knowledge is not obtainable, such as with COVID-19 (Strekalova, 2017). As a result, the public is reliant on the media to help ascertain the risk. Research shows that media coverage of a public

health risk such as COVID-19 can introduce particular risk characteristics that influence public perceptions (Pidgeon et al., 2003; Strekalova, 2017).

As information about COVID-19 changes over time, individuals are likely to reassess their risk level, by either amplifying or minimizing the subjective risk with the inclusion of the new data (Kasperson et al., 1988; Strekalova, 2017). People tend to incorporate risk information from a variety of trusted sources (including social media network members) to either amplify or weaken their perceptions of risk (Kasperson et al., 1988). Social media users tend to acquire information adhering to their pre-existing beliefs, ignore dissenting information, and form polarized groups around shared narratives (Lee & Choi, 2020; Schmidt et al., 2018). Furthermore, when polarization is high, misinformation might easily proliferate (Lee & Choi, 2020). Some studies pointed out that fake news and inaccurate information may spread faster and wider than fact-based news (Carlson, 2020; Waszak et al., 2018). As social media amplifies the spread of news, and people read news through links shared on social media (Allcott & Gentzkow, 2017; Waszak et al., 2018), understanding the role that social media plays on the sharing of misinformation is essential.

Media Richness Theory

Media Richness Theory (MRT) posits that richness of medium and equivocality of task influence the media chosen for communication (Daft & Lengel, 1986; Ishii, 2006). MRT bases media richness on the availability of immediate feedback, multiple cues, language variety, and personal focus. MRT posits that communication media has differentiated capacities in facilitating understanding. Media richness refers to the potential information load of communication media, emphasizing the abilities of promoting shared meanings (Daft & Lengel, 1986). The judgment criteria of media richness include feedback timeliness, multiple clues, language diversity, and personal focus (Daft et al., 1987). The theory emphasizes that higher media richness is not always better, but it depends on the context (Daft & Lengel, 1986; Daft et al., 1987). In other words, the best effects can be obtained when the media richness matches the task.

Recent studies have expanded MRT to social media and showed there is a valance variation in the ability of social media to convey specific types of messages; for example, the perceived media richness of Instagram was found to be more related to young adults' self-presentation via photos and videos, while on Facebook and Twitter, it relies more on openness in writing (longer or shorter) texts (Lee & Borah, 2020). Developments in social media technology have enabled people to create, communicate, and use multimedia content more easily. Content posted on social media is usually presented in plain text, pictures, or videos, while their media richness varies from low to high (Lee & Borah, 2020). Due the number of characters limit, Twitter users usually extend what they want to express by including complementary material, such as links to other website content, images, or videos (Lee & Xu, 2018). Other social media platforms, such as Facebook, offer multiple ways in which people can interact, such as social activities, instant messaging, photo sharing, video streaming, and sharing of news and articles (Lu et al., 2014). Leaner media can often convey essential messages in crisis communication in ways that are less sensational or emotion-provoking than richer media (Mano, 2014). However, unclear or ambiguous information and messages during the COVID-19 crisis on leaner media channels may increase

health anxiety (cyberchondria) and stress as well as influence the sharing of misinformation within social media networks (Farooq et al., 2020).

Future Directions for Research on Social Media Use, Risk Perceptions and COVID-19, and Health Behaviors and Outcomes

The COVID-19 pandemic has created a challenging situation for public health agencies and health communication researchers in terms of communicating risk for the virus and promoting protective behaviors among the public. During a public health crisis, it is essential to convey essential and accurate information to the public in real time. However, risk messages that are disseminated via social media should be crafted in a way that reduces traumatic stress responses to the information. Healthcare providers, as trusted community agents, play an important role in communicating COVID-19 risks to the public. Government agencies around the world have already used social media to encourage citizen engagement in crisis management. Effective crisis management requires timely communication and coordination between government agencies and a variety of stakeholders in society (X. Lin et al., 2016).

Public health agencies and organizations should closely monitor social media discussions to identify public concerns to further improve government responsiveness during the crisis. Individuals who have received training in risk communication and/or strategic communication may be ideal for monitoring public concerns online, delivering timely messages, communicating about the uncertainty of the virus, and making efforts to address public concerns online. Clear communication of risk could aid the development of accurate risk perceptions, in turn facilitating public adoption of protective behaviors. Data-mining algorithms have been used successfully in terms of detecting the unique characteristics of misinformation and fake news and removing them from their respective platforms (Shu & Liu, 2019; Zhang et al., 2019). Some social media providers, such as Twitter, Reddit, and Amazon, have already implemented such methods to remove fake accounts or product reviews. Social media and other online providers should adopt such measures to help identify and eliminate potentially harmful misinformation and rumors.

Another future area of research within this context is the need to examine the impact of social support within social media communities and discussions. Ni et al. (2020) found that social support was associated with reduced anxiety and depression in both the community and health professionals. Although physical distancing is recommended to reduce the spread of COVID-19, online social support networks should be maintained (or even increased) since they can provide people with informational, emotional, and even instrumental support. For example, many Facebook communities overlap with face-to-face communities (e.g., groups for parents in a specific city or rural area). Such social media communities can help people share resources such as a face masks and other PPE items, or other tangible goods and services to help people cope with the COVID-19 pandemic. Social support during times of crisis may influence risk perceptions, such as when social media network members help to clarify misinformation about COVID-19, or when they help promote self-efficacy by sharing

tips on ways to protect a person or his or her family members. Moreover, emotional support can help to reduce fear and anxiety during crisis situations, especially when messages convey that people are not alone in terms of the problems they face. While researchers have begun to examine the role of social media in terms of providing various types of social support (Oh & Syn, 2015; Wright & Miller, 2010), more research is needed to examine how people use online social support networks on social media during crisis situations, including pandemics like COVID-19.

Another important area of future research is examining cultural differences in using social media for risk communication. For example, people of differing cultural backgrounds may react differently to calls for social distancing due to varying cultural attitudes and norms regarding interpersonal interactions. Furthermore, some racial groups (such as African Americans) may distrust government messages more than other groups due to issues like institutional racism. Moreover, lower SES groups may differ in terms of literacy and health literacy. This is especially important since we know that COVID-19 has disproportionately affected many minority groups in the United States. People in rural areas may have different risk perceptions about contracting COVID-19 than people who live in densely populated cities. Other groups may be influenced by political cultural norms, such as individuals with certain political beliefs that social distancing, face masks, and other protective measures impinge upon their personal freedoms. Public health officials should consider such issues when crafting messages and attempting to reach vulnerable populations by providing targeted, tailored messages while taking appropriate literacy considerations into account.

Public health agencies should consider fully how media richness matches content type and emotional valence when creating social media content targeted toward influencing risk perceptions regarding COVID-19. Individuals who prefer richer media may benefit from the inclusion of videos or other content that can convey risk messages about COVID-19. For low literacy populations, video may help to convey messages in ways that do not require high levels of literacy. Public health officials should avoid using sensational images, videos, or language that might increase anxiety and stress when communicating COVID-19 health risks to the public. When using leaner social media, steps should be taken to ensure that risk messages are clear and designed in ways that reduce ambiguity in an effort to combat the spread of misinformation. When using social media like Twitter, links to appropriate additional information can be embedded within tweets. However, such links should direct people to highly credible sources that provide evidence-based information about COVID-19 that is presented in a clear, concise, and accurate manner.

Conclusion

Social media has played an important role in terms of influencing risk perceptions of COVID-19 since the beginning of the pandemic. Communication researchers should continue to study how various content and conversations regarding COVID-19 influence individual and collective risk perceptions and health behaviors associated with the virus. While social media (and the interactions that occur within them) can be important sources of news and information in terms of enacting protective behaviors

against the spread of the virus as well as important sources of social support in terms of coping with the stress related to the pandemic, social media can also contribute to the spread of misinformation and conspiracy theories about COVID-19. Future researchers should continue to study the many facets of social media, risk perceptions, and health behaviors within the context of COVID-19. Such research may inform COVID-19 data mining and analysis of social media content and user information studies as well as larger interventions targeting COVID-19.

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7

Overcoming Obstacles to Collective Action by Communicating Compassion in Science

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Introduction

> Throughout the ages, we have to rediscover that our community is not only made of the highly motivated, competing individuals ... but that it includes fragile, vulnerable, suffering individuals who reveal to ourselves our own fragility, our own vulnerability ... This fundamental discovery is at the heart of our humanity.
>
> *Source: Xavier Le Pichon*

More than any other time in history, the scientific community possesses a concentration of technical knowledge and skills that make it possible to protect the health and safety of humankind (World Health Organization [WHO], 2016). Remarkable advances in technology have provided better opportunities to exchange information and anticipate emerging threats (WHO, 2016). While such innovations have engineered a more prosperous and interconnected world, they have simultaneously rendered people more vulnerable to global risks (Evans et al., 2010). Indeed, experts note that many of the human activities responsible for societal progress (e.g., globalization, trade, and tourism) are the main drivers of emergence and amplification of our greatest threats (Bloom & Cadarette, 2019; WHO, 2016). Risks, like information and people, can travel across national borders and penetrate interdependent global networks (Evans et al., 2010; Giddens, 2003). In the same way, an isolated outbreak in Wuhan can transform into a global pandemic affecting 216 countries in just a few months (Stevens & Evans, 2020); a highly mobile threat can quickly ripple throughout civilization (Kasperson et al., 1988). As the COVID-19 pandemic swept across countries and then continents, the devastation felt across the globe has provided a sobering reminder of the interconnectedness of people around the world. Hence, our steadfast dependency on each other has solidified our understanding that societies around the world increasingly have a common interest in securing the greater good (Larsson, 2018; WHO, 2016). Further, we have a shared responsibility to proliferate, effectively communicate, and disseminate scientific information that reduces risks for the common good of individuals in our families, communities, and across the world. It follows, then, that there is

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a shared responsibility to mobilize collective actions as they provide a benefit to everyone (Evans et al., 2010; Jones et al., 2009; United Nations [UN], 2004).

In early 2020, the COVID-19 virus, which originated in Wuhan, China, slowly, then quickly, began to sweep across the globe; the world suddenly became simultaneously global, as we realized how quickly the virus was spreading, and small, as we realized how much responsibility we shared for the spread of the virus. Given the phenomenon of this global event, in this chapter, using the COVID-19 pandemic as an example, we will explain why traditional approaches to science communication that rely almost entirely on analytical information are insufficient to motivate collective action. Particularly, in crises that threaten catastrophic harm to others, the use of quantitative risk calculations and projections that pit human lives against other values often result in indifference toward the experiences and outcomes for others (Slovic & Västfjäll, 2019). Instead, we recommend public communication efforts that will intentionally convey the meaningful reality of complex, large-scale phenomena such that people come to care about the suffering behind statistics. By overcoming the tendency to dismiss urgent situations, communication efforts can encourage the public and leaders to follow expert recommendations and act in ways that secure the health and safety of all. We will describe the nature of collective action problems and how a variety of evidence-based strategies can elicit compassion as a basic motivation for engaging in behaviors that protect society. Finally, the chapter will conclude by challenging researchers and practitioners to consider additional avenues for moving people to care about the complex, shared problems facing humankind.

The Nature of Collective Action Problems

Unfortunately, when the threat of harm or suffering is distant—either temporally, spatially, or socially—people lose sight of their shared vulnerability and shared responsibility to act. Thus, many of today's societal challenges are viewed as *collective action problems*, or crises that result from failing to cooperate in the provision of global public goods (Gartner, 2012). In collective action problems, there is often a strong incentive *not* to cooperate, particularly if intervening comes at a cost to one's self-interest or national security (Gartner, 2012). The incentive to cooperate, then, is often conditional, such that it only makes sense to contribute if one believes everyone else is going to do their part (Barrett, 2007). As an illustration, consider the quintessential global phenomenon of large movements of refugees and migrants. Although the protection of refugees is recognized as a global public good (Betts, 2003), 85% of the world's forcibly displaced people are hosted by developing countries overwhelmed by conditions of poverty and acute food insecurity (United Nations High Commissioner for Refugees, 2020). Hence, those fleeing persecution and violence are inadequately protected because the burden disproportionately falls on countries already in financial distress (Ki-moon, 2016; Roper & Barria, 2010). Collective action among the international community would redistribute the effort so that the global public good could be provided.

Similarly, the coronavirus pandemic presented yet another collective action problem: the suppression of infectious disease provides a non-rival, non-excludable benefit for the global population (Barrett, 2007). However, it can only be accomplished if every

individual, every community, and every country across the globe participate fully in the effort. Slowing or containing COVID-19 necessitates individual action and sacrifice, surveillance, financing responses, and drug innovation, each of which require different levels of global cooperation (see Gartner, 2012). For instance, although the US has the capacity to rapidly coordinate medical countermeasures through the Biomedical Advanced Research and Development Authority (2020), without a vaccine or treatment, efforts to suppress the pandemic can be undermined by a single individual or link in the chain that fails to participate (see Bodansky, 2012). Because safeguarding global public health is outside the control of any one individual, group, or institution, sharing the responsibility is pivotal to combatting the infectious disease.

However, one of the biggest challenges in collective action problems is motivating individuals to act in ways that benefit people other than themselves (i.e., prosocial behavior; Kappes et al., 2018). Particularly in situations where there is uncertainty about how badly an outcome will affect oneself and others, prior research suggests that people do not always act cautiously or selflessly (e.g., Exley, 2016). Often, the sense of shared vulnerability is missing, particularly when the actor may not perceive the risk to oneself (Brennan et al., 2008). For example, in the refugee crisis, it is difficult to mobilize actions on behalf of distant strangers because the personal risk of suffering and harm is minimal. Even with the COVID-19 pandemic, where virtually anyone could be infected, only 26% of younger Americans say the virus is a threat to their personal health (Schaeffer & Raine, 2020). Such discrepant experiences with COVID-19 present an added challenge to provide the global public good (Karan, 2020; Sohrabi et al., 2020). Leading health authorities, including WHO Director Dr. Tedros Adhanom Ghebreyesus, have expressed frustration with young people who have resumed normal activities because they are at lower risk for serious illness (Higgins-Dunn & Kim, 2020). Indeed, White House advisor Dr. Anthony Fauci has pleaded, "you have to have responsibility for yourself but also a societal responsibility that you're getting infected is not just you in a vacuum. You're propagating the pandemic" (Higgins-Dunn & Kim, 2020, para. 11). While the risk is certainly not equivalently shared—older adults, immunocompromised individuals, and racial and ethnic minorities are more likely to become infected with the virus and die from COVID-19 (Centers for Disease Control and Prevention COVID-19 Response Team, 2020; Moore et al., 2020)—experts have been clear that all of us share the responsibility to protect those who are more vulnerable (Office for the Coordination of Humanitarian Affairs, 2020). In other words, actions may serve to protect oneself, but choosing not to act will likely harm others (Comfort et al., 2020). Hence, given our shared responsibility, compassion for others is key to mobilizing action during times when we may not be driven to act for ourselves or the immediate benefit of those we love (Batson & Shaw, 1991).

Obstacles to Collective Action: The Case of COVID-19

While the threat of infectious disease is not new—experts have long warned of the inevitability of a global outbreak (Osterholm, 2005)—the coronavirus pandemic has, in many ways, demonstrated the "surprising fragility of modern science-based societies" (Horton, 2020, p. 39). The global devastation has already reached a scale unmatched by any other disaster experienced in generations, with catastrophic human

and economic losses (Guterres, 2020). Alas, failures of government leaders, lack of concern and inaction from public citizens, and an overall lack of collective action have all contributed to the large-scale global loss. Regretfully, the global response has been largely fragmented (Horton, 2020; Lee & Yang, 2020). Although some countries acted swiftly by coordinating resources and aligning interdependent functions (e.g., South Korea), others reacted slowly by issuing woefully inadequate guidance and resorting to strategies of denial or blame (e.g., the United States; Comfort et al., 2020). Even as sovereign states vowed to support international cooperation, their responses have prioritized security within national borders, not as a global public good (Horton, 2020). Similarly, the response of individual citizens around the world has varied widely.

As with other collective action problems, the choices people make—either deliberately or through inaction—can affect not only themselves but their fellow citizens (Lunn et al., 2020). Health officials have been desperate to convince the public and leaders that the threat to society is not only legitimate, but that catastrophic humanitarian losses will be incurred if individuals do not respond to their guidance immediately and fully. Although science provides the foundation for competent decisions (Bolsen & Druckman, 2015; Dietz, 2013), many people do not share the same sense of urgency scientists and experts have about the coronavirus pandemic (Comfort et al., 2020). Therefore, perhaps unknowingly, communication has reinforced the conditions under which people can dismiss what is at stake and the pressing need of the prescribed action (Nisbet & Scheufele, 2009). This lack of urgency may be driven by distrust of science, political ideology, moral orientation, or cognitive biases.

Distrust of Science

Even though uncertainty is inherent in times of crisis, people expect leaders and experts to assuage their fears with accurate and timely information (Sellnow & Seeger, 2013). However, with COVID-19, scientists started with a limited understanding of the novel infectious disease. Information about COVID-19 was rapidly evolving as experts learned more about the virus' growth rate, severity, transmissibility, and responsiveness to weather (Sohrabi et al., 2020). Uncertainty is magnified when public health guidance is updated to reflect newly discovered evidence (van der Bles et al., 2020). Although this is a natural part of the scientific process—scientists understand that evidence is never definitive and that is an evolving landscape as we put more pieces of the puzzle together (Dietz, 2013)—non-experts become frustrated with the dizzying pace of research, shifting recommendations, and seemingly "temporality of facts" (Finset et al., 2020, p. 873). Hence, what scientists understand as the unfolding of facts as more information is revealed and input into the equation, the public sees as confusing and may distrust what they view as conflicting advice. Further, while scientific findings have been in short supply, the flow of information has been colossal (Finset et al., 2020). The Internet—as a digital space where everyone can share their viewpoints—has erased the formal distinction between expert and lay person, making it significantly harder for scientists to distribute consistent guidance (Abraham, 2011; Finset et al., 2020).

As a result, people doubt the existence of scientific consensus (i.e., agreement within the field about the correctness of knowledge; Shwed & Bearman, 2010) and question the integrity of recommendations. Social scientists refer to this phenomenon as the

politicization of science and warn that the consequential distrust and heightened anxiety makes people less supportive of the scientific information (Bolsen & Druckman, 2015). Unfortunately, experts try to counter anti-science rhetoric by doubling-down on the argument that *science is* truth (e.g., Fauci; Howard & Stracqualursi, 2020), assuming that if people had a better understanding of the evidence they too would see the urgency in taking life-saving collective actions (Nisbet & Scheufele, 2009). To further complicate our understanding of science, it is influenced by morality and political affiliations.

Ideological Differences

As in many other contemporary scientific debates, societal perceptions and decisions about public health actions are fueled by the advancement of moral imperatives or political agendas (Nisbet, 2014). The COVID-19 pandemic provided no exceptions. In early May 2020, just after one million Americans had been diagnosed with COVID-19, stark divisions along partisan lines were coming into focus. In the United States, whereas 97% of Democrats reported serious concerns about COVID-19, only 39% of Republicans remained seriously concerned about the outbreak (Change Research, 2020). In the same survey, when asked about precautionary actions, Republicans were significantly less likely than Democrats to engage in recommended behaviors such as wearing a mask in public (45% versus 90%), sheltering at home (43% versus 87%), or avoiding crowds (61% versus 95%). In another poll by Pew Research Center, 61% of Republicans feared state restrictions would not be lifted soon enough, while over 90% of Democrats worried restrictions would be lifted too quickly (Daniller, 2020). While it would be a gross oversimplification to suggest that political orientation explains all of the variability in public perceptions of COVID-19, to be sure, it is reasonable to say that conservatives and liberals have experienced and responded to the pandemic in dramatically different ways that can inform the development of messages designed to prompt action. Last, cognitive biases also interfere with our ability to process, understand, and act upon scientific information.

Cognitive Biases

Throughout the 2020 pandemic, experts relied on numerical information—cases confirmed, tests performed, patients recovered, and lives lost—to provide a coherent picture of the situation. Early on, authorities offered grim projections as evidence that, without a coordinated global response, the consequences of global pandemic would be catastrophic (Ferguson et al., 2020). Indeed, public communicators often use shocking statistics to alert people to a serious risk, assuming that individuals will act on public health guidance once they realize the magnitude of potential devastation (Sandman, 1993). However, research on decision-making and risk shows that psychological mechanisms interfere with people's ability to process and act on numerical information (for a review, see Slovic & Slovic, 2015). Essentially, as the numbers (of infections or deaths in this case) increase, individuals become insensitive to suffering and are less likely to act. This phenomenon, known as the *arithmetic of compassion*, describes how cognitive biases can function as barriers to effective action when faced with catastrophic harm and suffering (Slovic & Västfjäll, 2019).

Particularly when the statistics speak for human lives, numbers blur together in such a way that 100 deaths, 1 million deaths, and even 2.2 million deaths "feel" the same: abstract and meaningless. This *psychic numbing effect* explains why people's concern for others fades when the number of lives at risk increases (Fetherstonhaugh et al., 1997; Västfjäll et al., 2015). Additionally, emphasizing the size and scope of the pandemic's destruction draws attention to the large number of people who are not being saved. Although it is understandable that, despite our best efforts, not everyone can be protected, this type of information creates an illusion of inefficacy, or *pseudoinefficacy* (Bartels & Burnett, 2011; Small et al., 2007). Disappointingly, the recent pandemic illustrates how people respond with indifference to large-scale tragedies. Even as the COVID-19 death toll climbs toward 1 million globally, many people mistakenly believe their behaviors (e.g., wearing a mask in public, sheltering at home, and avoiding crowds) are insignificant against such a large and diffuse crisis (Czeisler et al., 2020; Slovic & Västfjäll, 2019). Unfortunately, psychic numbing and pseudoinefficacy work against collective action; the human mind is easily desensitized to human suffering and misled into thinking that our actions are inconsequential.

As such, it may be that a combination of tactics is more effective than delivering scientific information through numbers alone. Strategies that motivate compassion—the concern for another's undeserved suffering and the desire to minimize it (Goetz et al., 2010)—may be the most helpful in addressing collective action problems.

Communicating Compassion in Science

As illustrated above, when it comes to making decisions that affect others, the arithmetic of compassion fails us: Representing humanitarian disasters and large-scale health crises through numbers and analytical models of reasoning simply stops short of eliciting feelings of concern for others. Particularly in crises where protective actions may have the potential to disrupt one's self-interests, strategies are needed to prompt a sensitivity to the suffering and risk carried by others. When public health is dependent on the collective actions of individuals, public communication must do more than deliver accurate and timely scientific information. It must convey a sense of relevance, importance, and urgency, but also compassion. We suggest efforts begin by incorporating strategic appeals to compassion, moral reframing, and narrative persuasion so that people respond with concern for the welfare of others. Although individuals may harbor doubts about the risk to themselves, inducing compassion in times of crisis may lead them to make decisions that ultimately minimize harm and suffering.

Appeals to Compassion

It is well understood by scholars of strategic communication that message-relevant emotions are useful in motivating a specific change in attitudes and behavior (Dillard, 2019). Often, risk communication during public health emergencies tries to motivate individuals to safeguard their personal health and safety by scaring, angering, or guilting people into compliance (Sandman, 2012). Admittedly, most research on emotion in the context of persuasion has explored negative emotions (Nabi, 2002); however, contemporary research points to the untapped potential of positive emotions in

driving persuasive outcomes (e.g., Chadwick, 2015). It stands to reason, then, that appeals to other-oriented emotions, such as compassion, may trigger the altruistic motivation that is missing in collective action problems. Compassion is characterized by subjective feelings of warmth, concern, and care for another (Goetz et al., 2010). Perhaps more importantly, it directs individuals to approach those in need and engage in prosocial behaviors that improve their wellbeing (Batson, 2017). As a discrete emotion, compassion is defined as the distinct feeling that arises when observing another's undeserved suffering or unmet need and the subsequent urge (and commitment) to alleviate that suffering (Gilbert & Mascaro, 2017; Goetz et al., 2010; Lazarus, 1991).

Compassion is commonly mistaken for empathy, or the capacity to share the feelings (both positive and negative) and cognitions of others (Batson, 2017). When witnessing another's distress, empathy may lead people to vicariously feel distress *with* the other (Batson & Shaw, 1991; Singer & Klimecki, 2014). By contrast, compassion is felt *for* another and notably triggers a uniquely altruistic motivational urge to relieve the other's suffering rather than one's own distress (Goetz & Simon-Thomas, 2017). Compassion is also distinct from pity, as the latter "contains a nuance of condescension that distinguishes it from compassion" (Nabi, 2002, p. 298; but also Lazarus, 1991). Additionally, unlike other prosocial emotions (e.g., love and gratitude), compassion can be felt for those outside of our personal self-interests (Smith et al., 2014). Although the study of compassion as a discrete emotion is still in its infancy, research has demonstrated that it serves an adaptive function to motivate cooperation, social connection, and the protection of those who are vulnerable (for a review see Goetz et al., 2010 or Stellar & Keltner, 2014). Thus, in situations where individuals witness another's plight but do not perceive themselves to be vulnerable (e.g., refugee crisis and coronavirus pandemic), activating compassion could drive better compliance with recommended collective actions.

The pertinent question in this chapter is how does one elicit compassion? Based on evolutionary evidence, empirical findings, and insights from appraisal theories, Goetz and colleagues (2010) proposed a specific pattern of evaluations that elicit compassion. First, observers must appraise the suffering of another as relevant to their personal goals, aspirations, or broader values. Goetz et al. contend that observers must also judge the suffering of another to be incongruent with their personal goals. If, for instance, an observer finds they benefit from the suffering (e.g., torturing an enemy), then the resulting emotion is schadenfreude instead of compassion. Next, observers must ascertain that the sufferer is not to blame for their suffering. Should the sufferers be responsible for the negative consequences, then anger toward the sufferer, rather than compassion, may be experienced by the observers. Finally, to experience compassion, observers must also appraise that they have the ability to respond adaptively to the unjust suffering of another (Goetz et al., 2010). Should observers instead realize that the cost for taking action (e.g., monetary, emotional fatigue, and potential for exploitation) is too high, or that their abilities are inadequate, then anxiety, fear, or personal distress may be elicited. Along the dimensions of self-relevance, goal incongruence, blame/deservingness, and coping ability, the specific appraisal profile outlined by Goetz et al. differentiates compassion among other discrete emotions (see also Stellar & Keltner, 2014).

Appraisal models of emotion, such as the one outlined by Goetz et al. (2010), offer an instructive framework for communicators to design persuasive messages that evoke

the emotion. As such, a compassion appeal based on the aforementioned model should include components that trigger each of the four appraisals. With this framework in mind, next, we consider the construction of a compassion appeal that could be applied in the COVID-19 pandemic.

First and foremost, a compassion appeal should present the suffering of vulnerable others as a result of the coronavirus disease. This could include the presentation of facts and statistics that summarize the misfortune experienced by those who have contracted the disease or even lost their lives to the illness. The appeal could also provide visual evidence of those suffering by showing people in hospital beds connected to ventilators as they are fighting for their lives, or offer testimony from individuals who have been burdened by the loss of their livelihood due to COVID-19. Another approach to show suffering may be to focus on the surviving family members who are left to pick up the pieces of their broken lives. Based on a preliminary understanding of the message recipient's motivations and values, messages can present different elements of an individual's suffering that are both relevant and incongruent with personal goals. As Goetz and colleagues' (2010) model instructs, for compassion to be elicited, the observer must judge that the sufferer is not responsible for their hardship. In other words, a compassion appeal should intentionally show that the sufferer is a victim of the pandemic. A message may then emphasize that the victim's vulnerability to COVID-19 is beyond their personal control (e.g., risk of contracting the virus is also dependent on the behavior of fellow citizens) and that they should not be blamed for the negative consequences endured.

To further illustrate the implications for message construction, consider the known fact that obesity is one of the leading factors in COVID-19 mortality and morbidity (Bailony, 2020). Communicators may be tempted to feature obese individuals in their public appeals to care for and protect those that are most vulnerable to the disease. However, without considering the appraisal dimension of deservingness/blame, compassion may not follow. If the observer perceives that the sufferer has made poor choices that led to their obese condition, then they may blame the individual for their elevated risk of severe consequences. Rather than feeling compassion for the person (and consequently taking action to protect them), an observer may experience indignation or anger toward the sufferer. Particularly, when the desired response potentially disrupts one's personal life, they may be unwilling to alter behavior if the sufferer is undeserving of their compassion. A safer approach may be to focus the appeal on individuals who are less likely to be held responsible for their vulnerability. For instance, messages could feature those with conditions that are not an outcome of individual choices, such as sickle cell disease, cystic fibrosis, or other hereditary and autoimmune diseases. Additionally, showing the suffering of younger children may also elicit a similar appraisal. Showing the adverse consequences that COVID-19 can inflict on these vulnerable others should facilitate the experience of compassion by way of their blamelessness and deservingness of assistance.

Encountering the unjust suffering of another may still not be enough to evoke compassion if the individual feels incapable of dealing with the situation (Goetz et al., 2010). Because prosocial actions are often perceived as "costly to the self for the benefit of others" (Oveis et al., 2010, p. 616; also Lazarus, 1991), an appraisal of coping ability is pivotal to driving altruistic motivation. As such, compassion appeals should suggest that the cost of acting is manageable (i.e., sufficient availability of cognitive, emotional,

and material resources in relation to the possible negative consequences for acting) and that the actions are efficacious in reducing the suffering of others. Continuing with the above example, a compassion appeal could be constructed to show the severe COVID-19 effects experienced by individuals with sickle cell disease while offering an explanation of how and why individual behaviors (e.g., wearing facemasks, physically distancing, etc.) can easily and effectively prevent this suffering. Additionally, research indicates that the perceived absence of gratitude on behalf of the benefactor (i.e., sufferer) is an important consideration that ultimately hinders helping behavior (Lazarus, 1991). Based on this logic, messages that show appreciation and reciprocation by those suffering may influence the appraisal of efficacy in such a way that favors action.

As with other societal problems, communication that encourages collective action plays a pivotal role in people's decisions about accepting public health guidance (Lunn et al., 2020). However, the fragmented response to the global pandemic suggests that many people are unwilling to take actions when they perceive no risk to themselves (Comfort et al., 2020; Horton, 2020; Karan, 2020). The unfolding health crisis provides a comprehensive illustration of how the communication from scientists does not adequately mobilize individuals and government leaders to act on behalf of others. Compassion appeals, if properly constructed, provide promise to motivate collective societal action by eliciting compassion toward those experiencing unjust suffering.

Moral Reframing

In many ways, morality is considered the bedrock of a functioning society, wherein people are guided by a shared understanding of what is right and wrong. Moral intuitions are responsible for guiding cooperative behaviors, such that people are compelled to override their self-interests and act when they observe moral violations or shared values being threatened (Haidt & Joseph, 2004; Milesi & Alberici, 2018). It then follows that morality may serve as motivation for collective action, as individuals have to make decisions that affect the welfare of another, perhaps more vulnerable, person (Kappes et al., 2018). Indeed, morality provides a useful lens for understanding how members can defy appeals to collective action (e.g., public health guidance; Graham et al., 2020) or justify the exclusion, dehumanization, or derogation of an outgroup (Kesebir & Pyszczynski, 2011; Pilecki, 2017).

Recognizing that morality plays an increasingly large role in societal conflicts, persuasion researchers have turned to interactionist theories of moral behavior to explain how individuals perceive and act out of moral obligation (Feinberg & Willer, 2019; Kovacheff et al., 2018). Empirical findings support the general effectiveness of moral appeals in influencing willingness to act in the interest of others, particularly in the context of prosocial health behaviors, such as blood donation (e.g., Ferrari & Leippe, 1992), organ donation (e.g., Hansen et al., 2018), and social distancing (e.g., Luttrell & Petty, 2020). Importantly, though, scholars have discovered that not all individuals perceive the same issues to be moral imperatives (Graham et al., 2013) and are driven to collective action by different moral motivations (Milesi & Alberici, 2018). Moral foundations theory (MFT) argues that an individual's moral compass is a pluralistic system composed of certain foundations that influence attitudes and guide decision-making (Graham et al., 2013). People vary in their calculation of which foundations are most important, and systematic differences between these moral subcultures

construct group virtues and establish a pervading group narrative (Graham et al., 2011). Individuals who prioritize *individualizing foundations* (i.e., care/harm and fairness/cheating) tend to be driven by the protection of individuals from harm or unfair treatment by people or institutions. In contrast, individuals who endorse *binding foundations* (i.e., loyalty/betrayal, authority/subversion, and sanctity/degradation) tend to focus on safeguarding the institutions that bind groups together by respecting traditions and upholding obligations (Graham et al., 2009).

Research has consistently found that ideological differences can predict an individual's moral orientation (e.g., Graham et al., 2009; Haidt & Graham, 2007; Koleva et al., 2012), such that liberals perceive moral violations in terms of actions that threaten an individual's rights and/or welfare (i.e., individualizing foundations) while conservatives think of moral transgressions as nonconforming behaviors that threaten the social order (i.e., binding foundations; Federico et al., 2013). From this perspective, the conflicting positions often taken by liberals and conservatives can be explained by their divergent approaches to morality, rather than the absence of morality (Kovacheff et al., 2018).

Although some scholars do not approach moral persuasion from a pluralistic perspective (e.g., Luttrell & Petty, 2020), a growing body of literature supports the effectiveness of tailoring arguments to match the intended recipient's moral orientation (for a review, see Feinberg & Willer, 2019). Particularly when arguing in favor of a position that one would typically oppose, scholars have found that restructuring information in a way that is consistent with an individual's guiding moral compass can lead to greater support for the counterposition (e.g., Wolsko et al., 2016). This type of *moral reframing* builds associations between the issue and their personal beliefs about what is morally acceptable (Lakoff, 2004). As a result, messages appear more relevant, familiar, and personally important to the intended recipient (Feinberg & Willer, 2019). In other words, moral reframing is a persuasive tool to show how an otherwise conflicting position may be acceptable—or even favorable—when viewed through their personal moral lens (Kovacheff et al., 2018).

Appreciating that people evaluate information from divergent moral frameworks is pivotal to constructing messages that motivate collective action. Studies show that messages calling for the support of unfairly disadvantaged groups (Skurka et al., 2020) or to help suffering individuals (Süssenbach et al., 2019) resonate with audiences who are primarily driven by individualizing foundations, but not those who endorse binding foundations. Unfortunately, people tend to craft arguments from their own moral perspective, rendering their messages ineffective at persuading their political rivals (Feinberg & Willer, 2019). Indeed, appeals made by politicians during the COVID-19 pandemic surrounding mitigation measures reveal similar patterns of moral rhetoric. Consider the following statement made by Democratic Governor Kate Brown:

> We wear face coverings to protect the doctors and nurses working day and night in hospitals and clinics around the state. We wear them to protect our elderly neighbors. We wear them to protect kids in cancer treatment and people with compromised immune systems. We wear them to protect the grocery store clerk and the pizza delivery gal. We wear them because we don't want to accidentally kill someone. It's really that simple. Face coverings save lives.
>
> *(State of Oregon, 2020, para. 3)*

Governor Brown's plea to her constituency centers on arguments that value the care and protection of other individuals. Consistent with individualizing morality, she emphasizes the inequitable distribution of risk, explicitly calling on Oregonians to wear face masks to save the lives of those that are most vulnerable to the illness. Her appeal assumes that everyone will be motivated to engage in collective action because of a shared moral obligation to prevent harm and suffering for other people. This approach stands in contrast to that of Republican Governor Mike DeWine, during his July 15, 2020 statewide address:

> Tonight, I'm asking each of you to take action now. To sacrifice now, so that our kids can be in school this fall. So they can at least have a chance to play sports. So our businesses can remain open. So that Ohioans can continue earning a living, a paycheck, and support their families.
>
> *(The Ohio Channel, 2020, 9:58)*

Unlike Governor Brown, Governor DeWine emphasizes a duty to the ordered institutions and systems that bind people together. Rather than focusing on an individual's unfair suffering, he highlights other economic and civil liberties that are at stake. Also, consistent with binding morality, DeWine underscores the importance of family and traditions that strengthen communities.

Both governors are presenting the recommendation to wear a mask as a moral imperative; however, their arguments reveal different evaluations of right and wrong according to individualizing and binding foundations. Whereas Governor Brown expects people will view the suffering of high-risk individuals as a moral violation, Governor DeWine assumes Ohioans will be driven by their obligation to strengthen family and in-group bonds. As both excerpts illustrate, politicians tend to retreat into the moral rhetoric that appeals to their like-minded base (Feinberg & Willer, 2019). Whereas both messages intend to compel all constituents to follow public health guidance, they are less likely to trigger a sense of moral urgency for individuals who are driven by contrasting foundations. With respect to the COVID-19 pandemic, conservatives are known to be less compliant and accepting of expert recommendations (Daniller, 2020). Thus, it follows that politicians and health authorities should resist messages that exclusively appeal to care/harm and fairness/cheating when trying to persuade non-compliant individuals. Preliminary evidence suggests that moral messages focused on duties and responsibilities to one's family and fellow citizens are more effective at changing intentions to comply with COVID-19 public health actions (Everett et al., 2020).

In sum, catering messages toward individuals' moral orientations may stimulate more action, and particularly collective action. In times when we need to work together for the common good, it is particularly critical to develop messages with strategies that will be far reaching ideologically and acceptable to individualizing and binding foundations. The next section outlines how narratives and stories may be used to promote collective action responses to science communication.

Narrative Persuasion

In addition to compassion appeals and moral reframing, narratives offer yet another approach that could aid in the elicitation of compassion for the purpose of

motivating collective action. COVID-19 represents a collective societal problem in a need of collective solutions and action. Narratives can impact "attitudes toward collective solutions to address societal-level issues" (Skurka et al., 2020, p. 4161, but also Crow & Jones, 2018; Strange & Leung, 1999). Traditional science communication has relied on rhetorical, or non-narrative, presentation of facts, statistics, and arguments to persuade individuals to accept scientific findings (e.g., Stolberg & Weiland, 2020), an approach that has contributed to the aforementioned psychic numbing effect (Västfjäll et al., 2015). Narratives, on the other hand, are uniquely structured to minimize the effect of psychic numbing by refocusing the attention away from explicit arguments and numbers and onto the story intended to deliver the desired outcomes. That is not to suggest that narratives cannot include arguments (e.g., Hoeken & Hustinx, 2009) or claims and evidence (e.g., Dahlstrom, 2010) embedded in the storyline, but, rather, that narratives, according to Mar and Oatley (2008), offer the opportunity for "learning to understand and anticipate other people's states of mind and feel *compassion* with their fates" (italics added for emphasis, Bilandzic & Busselle, 2013, p. 213). With our brains wired for stories and their ability to touch emotions, Green and Brock (2005) considered the narrative as the most influential mode of communication delivery. As such, narratives, if structured properly, have the capacity to elicit compassion as an antecedent to desired collective action.

In order to properly structure narratives, it is important to understand the mechanisms responsible for the success of narrative persuasion. One of the most significant elements associated with narrative persuasion is the notion of transportation (Bilandzic & Busselle, 2013; Green & Brock, 2005). Generally, individuals transported, or absorbed, into the story, experience stronger emotions (Oatley, 2002) and attitudinal shift toward the position advanced in the narrative (Green & Brock, 2005). Slater (2002) suggested that narratives "may be one of the only strategies available for influencing the beliefs of those who are predisposed to disagree with the position espoused in the persuasive message" (p. 175). Dal Cin et al. (2004) argued that transportation can lead individuals to embrace narrative-consistent beliefs, regardless of initial position of the narrative receiver (Green & Brock, 2000).

Empathy (Zillmann, 1995, 2006) and character identification (Murphy et al., 2011) are two additional key mechanisms credited for the success of narrative persuasion. Although similar, empathy and character identification are different concepts. While the latter refers to the ability of the transported narrative receiver to identify with the character, the former refers to the ability of the narrative receiver to share the emotional experiences displayed by the story protagonists regardless of whether the receiver identifies with the story character (Skurka et al., 2020). As such, empathy and character identification represent independent mechanisms that can enhance the percussive effect of narratives. Yet, narratives can use additional elements—imagery, suspense, and literary devices (e.g., irony and metaphors)—not usually associated with non-narrative, rhetorical persuasion, to enhance their effectiveness (Green & Brock, 2005). Taken together, these mechanisms of narrative persuasion show the relative advantage of narrative over rhetorical persuasion prompting Moyer-Guse and Nabi's (2010) to posit that the best way to counter resistance to persuasive messages may be to: (i) disguise the persuasive attempt in the narrative; (ii) create parasocial interaction with sympathetic characters, thus lowering the perceived authoritativeness and

controlling nature of the message; and (iii) identification with, or liking of, the main characters in the story.

The next topic of import when considering narratives, as elicitors of compassion for the purpose of generating collective action, is the context in which narrative messages may find success. The extant studies suggest that narrative messages are effective in both personally relevant and irrelevant contexts (Green & Brock, 2005; Wheeler et al., 1999) and across political convictions (Skurka et al., 2020). Thus, narrative persuasion could be an equally effective tool to use across ideologically polarized topics with individuals highly concerned with the consequences of the COVID-19 pandemic and individuals who either fail to acknowledge its presence or are unconcerned with its outcome.

Last, we will explore the focus of the narrative. Skurka and colleagues' (2020) findings suggest that both individualized and collective approaches elicit transportation and demonstrate efficacy; however, an individualized approach is better suited to reach ideologically diverse audiences. Focusing on individuals rather than larger groups of people (the societal collective) also helps minimize the effects of psychic numbing and compassion fade (Västfjäll et al., 2014), as the attention is moved away from the numerical effect of the pandemic at the societal level to the experiences of individuals dealing with the consequences of COVID-19. While rhetorically delivered COVID-19 numbers, facts, and statistics could be dismissed by individuals as elaborate organized hoax (Slessor, 2020), narratives are well suited to present lived experiences, which are typically more difficult to dismiss and counterargue (Oatley, 2002). Thus, showing the individualized experiences of COVID-19 patients in hospitals, as they struggle with the disease, presents a challenge to counterargue. For example, Bill Plaschke, a prominent sport journalist wrote a column appearing in the *Los Angeles Times* about his bout with the disease and his feelings of anger and dread as he wondered whether he would survive the experience (Plaschke, 2020). As his detailed experiences are subjective in nature, they are not easy to dismiss or disprove.

Another poignant narrative example is the compilation of posts and videos produced by Amanda Kloots, the wife of Canadian Broadway actor, Nick Cordero, who lost his battle with COVID-19. In her regular posts with daily, even hourly, updates, she documented the emotional toll and cruel nature of the disease which took her 41-year-old husband (Moniuszko, 2020). Her posts took the followers on many emotional rollercoasters filled with hope and despair. During this process, Kloots lamented Cordero missing their 1-year-old son taking his first steps, while Cordero remained hospitalized (Yasharoff, 2020). Yet, throughout her socially shared ordeal, she continued to urge people to take the virus seriously, warning of its indiscriminate effect on individuals and families:

> This is my reminder to you to stay safe, wear your mask, wash your hands, social distance and don't leave your home unless you have to. You don't want this virus. You don't want your loved one to get this virus. It's still here and unfortunately increasing again. I never thought Nick or I would get COVID and we both thought of [*sic*] we did we would be able to stay at home and recover. Nick is 41 years old, in shape and had no preexisting health conditions. He is going on day 75 in the ICU. My heart breaks for him everyday. Please be safe.
>
> *Source: Moniuszko (2020). © 2020, USA Today.*

Kloots' story represents a notable example of embedding the persuasive content of the message in an emotional and highly individualized narrative that unfolded over multiple months. The story showed potential to transport individuals into the narrative and lives of Kloots and Cordero. It also delivered characters with whom people could both empathize: a young, physically fit, father and a grieving wife.

As it unfolded, Kloots and Cordero's story provided the opportunity for followers to feel compassion for the protagonists' fate (Mar & Oatley, 2008). Compassion, in turn, "pushes us to understand how we have structured the world, and to ask how we can structure it better ... because others are suffering and that is not how the world should be" (Galea, 2020, p. 1898). In her narrative, Kloots provides the answer to how the world could be structured better by pointing to expert-supported behaviors expressed in her quote.

In the above example, we illustrated the potential of narrative messages to deliver collective action not by arguing the importance of evidence or statistics but by eliciting compassion with the unjust fate of suffering others. As such, narratives represent an important message delivery vehicle that should occupy a more prominent role in communicating scientific information.

Conclusion

In a global environment, our interconnectedness is illuminated more than it has been at any other point in history. We depend on one another to ameliorate threats and engage in collective action to protect one another. Further, we have a shared responsibility to disseminate and collectively respond to scientific information that benefits the collective. Hence, it is critical that we develop messages aimed at mobilizing collective action and maximizing public responses. As we have outlined, messages seeped in compassion, with a moral orientation that appeals to the audience, and a narrative that transports individuals into the story optimize the potential for a collective response to scientific communication in order to propel individuals, communities, countries, and the world toward a better future.

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8

Communicating the Science of COVID-19 to Children

Meet the Helpers

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Early in the morning of June 12, 2016, a shooter entered Pulse Nightclub in Orlando, Florida, and opened fire, claiming the lives of 49 innocent people and injuring 53 more. Central Floridians and the nation woke up to the news of America's largest mass shooting to date, and thousands were left grieving this senseless act of violence. As a new Public Broadcasting Service (PBS) station, founded less than four years earlier, and with no news reporting ability, WUCF wanted to support the Orlando community, but had no experience in community crises. The programming and engagement staff's immediate reaction was to rely on WUCF's strengths in public media—trusted children's programming—and the Orlando community responded overwhelmingly. Local news outlets covered WUCF's efforts to provide resources for children. Community organizations used the station's resources in their outreach. In response, parents reached out to WUCF with questions such as: Do I take my child to a memorial? Should I let them see me cry?

In the week following the shooting, WUCF produced a 30-minute public affairs program about how traumatic events impact children, curated a community calendar, and created a community help guide for victims and families in need. The station also disseminated resources from partners like PBS, Fred Rogers Company, and Sesame Street Workshop, but noticed a void in video content about emergencies for children.

In the wake of the Pulse event, PBS stations across the nation offered help and support. It was a true testament to the power of public media and the generosity of the entire PBS system. After its immediate response, WUCF knew tragedies of this nature would not end with Pulse. Then, in October 2017, Las Vegas experienced the deadliest mass casualty shooting in our nation's history. WUCF's staff dedicated themselves to giving back to a system that supported it through the challenging period after the Pulse attack. The programming and engagement staff's goal was to develop a quick response toolkit that public media stations could use in the event of a community crisis to support our most vulnerable viewers, children. Working with Dr. Judith Levin, a University of Central Florida professor and expert in Child Development and Education, WUCF developed a suite of resources for stations and community partners, and *Meet the Helpers* was born.

Meet the Helpers is a multiplatform initiative that teaches children about emergency preparedness and the people who are there to help in such situations. Many children

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may have questions when emergencies occur in their communities but feel uneasy about asking them. Even without being personally involved in tragedies, children notice changes in routine, upsetting news reports, and changes in behaviors from adults immediately following a community crisis. *Meet the Helpers* was created to give public television stations of all types—regardless of news reporting ability—the resources needed to respond in times of crisis and support our youngest viewers. The original project included videos for the following helpers: doctors, meteorologists, paramedics, 911 operators, firefighters, teachers, and police officers.

Previous research has confirmed the viability of the *Meet the Helpers* initiative to provide risk and crisis communication lessons to children. Cook (2020) evaluated children's response to *Meet the Helpers* messages using the IDEA model (internalization, distribution, explanation, and action) (Sellnow & Sellnow, 2019). The IDEA model is "a learning theory-based model," the utility of which "can be measured using affective (perceived value, relevance), cognitive (comprehension, understanding, efficacy), and behavioral (actions) learning outcomes" (Sellnow, Lane, Sellnow, & Littlefield, 2017, p. 555). The goal is for viewers to understand the message (cognitive), realize the importance of the message in crisis situations (affective), and identify what they can do to help the helpers and to be a helper themselves (behavior). Previous research revealed that children viewing the *Meet the Helpers* videos were indeed able to comprehend the message, recognize the risk or crisis situation the helpers address, explain the helpers' role, and describe appropriate helping behaviors/actions they could take to help (Cook, 2020). The advent of coronavirus, however, posed a new challenge for the *Meet the Helpers* programming. Rather than rapidly emerging and quickly dissipating risks or crises, the threat of COVID-19 created a long-lasting risk that directly impacted the children's lifestyles for months. This study describes and evaluates WUCF's efforts to adapt their *Meet the Helpers* program to address the long-standing threat of a global pandemic. To do so, we first offer a more detailed review of the IDEA model and introduce the concept of collective efficacy as the ultimate behavioral learning outcome desired in response to COVID-19. Next, we describe the adaptations made in the *Meet the Helpers* program to meet this challenge of collective efficacy. Finally, we provide conclusions and recommendations for communicating collective efficacy to children in health-related crises such as pandemics.

Protective Action during Crises

When instructions for taking protective action are interwoven with warnings, uncertainty and anxiety are reduced for those at risk (Mileti, 1995; Mileti & Sorenson, 1990). As such, instructional communication is a central element of both risk communication (Sellnow & Sellnow, 2010; Sellnow, JohanssonSellnow & Lane, 2019) and crisis communication (Sturges, 1994). Pandemics, such as the one experienced due to the recent coronavirus outbreak, require instructional communication related to both self-care and strategies for diminishing spread of the disease (Reynolds & Quinn, 2008). The ultimate goal of such instructional communication during a pandemic is to "galvanize the population to take a positive action or refrain from a harmful act" (Reynolds & Quinn, 2008, p. 13S). The IDEA model has demonstrated its utility as a viable framework for designing and distributing effective instructional messages for mitigating

harm and taking protective actions, thereby, providing the theoretical grounding for this analysis.

The IDEA Model

IDEA is an acronym representing the four essential elements in the model (Sellnow & Sellnow, 2019). Research reveals that effective instructional risk and crisis communication messages are most effective when they address all four elements (e.g., Littlefield, Beauchamp, Lane, & Sellnow, 2014; Sellnow et al., 2019; Sellnow, Lane et al., 2017; Sellnow, Parker et al., 2017).

The "I" stands for internalization and refers to elements that motivate receivers to pay attention to and remember. This can begin to be achieved, for instance, through compassion by offering genuine concern for those affected and their loved ones. Then, a spokesperson can motivate receivers by helping them understand both the personal relevance and potential impact of the risk or crisis to them and those they care about. In the case of COVID-19, this can be achieved by mentioning where the infections are and how quickly the disease spreads, how sick people may get, and how many people may even die. When people fail to internalize the importance of the message, they are less likely not only to pay attention to it but also to enact the actions proposed in it (Sellnow et al., 2018).

The "D" stands for distribution and has to do with the communication channels used to reach different audiences. In terms of the *Meet the Helpers* program, channels include short public service messages delivered by "helpers" and inserted between segments of public television children's programs. To be most effective, a consistent narrative should be distributed through multiple channels. *Meet the Helpers* is available on public television, social media, individual station websites, and television channels, as well as PBS LearningMedia and station partners. People seek confirmation (i.e., convergence) of messages by checking multiple sources. If the messages are different (i.e., divergent), confusion ensues, which may lead to misunderstandings, as well as inappropriate actions (Herovic et al., 2020).

The "E" stands for explanation. To clarify, what is happening must be described accurately and translated intelligibly by a trusted spokesperson to be most effective (Sellnow & Sellnow, 2019). Communication failures regarding explanation can lead to reduced self-efficacy, inaction, or even inappropriate actions (Sellnow, Iverson et al., 2017). Overcoming such challenges has become both more demanding and more imperative with the intensification of and accessibility to social media platforms where misinformation, disinformation, and malinformation can spread rapidly worldwide (Humprecht et al., 2020). In the case of the *Meet the Helpers* and COVID-19, doing so means using words and illustrations that are age-level appropriate. For example, it would be accurate to say "COVID-19 is a virus that spreads through respiratory droplets when an infected person coughs, sneezes, or talks." However, when talking to children, the message might be translated to say "COVID-19 is a virus that makes people very sick. It's so small we can't even see it when it travels through the air from one person to another when we cough or sneeze or even talk."

Finally, the "A" stands for action and refers to specific behaviors that receivers should take (and sometimes should NOT take) to protect themselves and others from the potential risk or consequences of the event. To be successful, these actions must be

specific in terms of what to do and/or what not to do in both preparation and response (Gulliford & Sellnow, 2020). For example, to protect livestock from harmful spread of infectious life-threatening diseases, proposing that receivers "practice biosecurity" is not specific enough. Rather, such instructions ought to describe the exact steps to take when one enters and exits a farm (shower in and shower out procedures) (Sellnow, Parker et al., 2017). In the case of COVID-19, these actions include social distancing, wearing a mask in public, and staying home when feeling sick. For children's messages about COVID-19, the key to success is explaining what six feet means for social distancing, why/how to wear and take care of a mask even if they don't feel sick themselves, and what to do if they do feel symptoms.

Most of the instructional communication in risk and crisis literature focus on explanation (sharing information) at the expense of internalization (motivating to attend via relevance and impact) and action (specific steps) (e.g., Frisby et al., 2014; Sellnow-Richmond et al., 2018). Moreover, when specific actions steps are offered, they tend to focus on what individuals should do (Bandura, 2000). However, there is an underlying assumption that these actions may be achieved more effectively as part of a greater collaboration among those in a community who are facing the same danger. Evacuation for self-protection from an approaching hurricane, for example, requires collaboration in the formation of evacuation routes and the creation of emergency shelters. Such collaboration allows for systematic responses that instill a sense of order during times of high uncertainty and disruption. Although such collaboration is an inherent feature in most crisis response plans, limited research has isolated the communication features that best promote coordination during crises, particularly in the protective actions that are recommended for those at risk. Bandura (2000) described such collective community actions as collective efficacy.

Collective Efficacy

Bandura's (2000) conceptualization of collective efficacy provides a practical explanation of how protective actions at the individual level connect with larger community efforts to manage risk and reduce harm. Bandura explained, "individuals' judgments of their personal efficacy are not detached from the other members' enabling or impeding activities" (p. 76). For example, those who refuse to evacuate as requested in the event of a hurricane strain available resources of first responders by creating the need for emergency rescues that could have been avoided. Likewise, those who hoard food or other supplies prior to the onset of a hurricane or pandemic create shortages that impede the protective efforts of others. Similarly, those who refuse to abide by standards of self-protection during pandemics, such as social distancing or wearing masks, hinder the collective efforts of communities to contain spread of the disease. In many cases, then, protective actions are recommended during high risk or crisis circumstances with the expectation that, as more people enact the recommended actions, the community as a whole will experience greater benefits. Bandura (2000) accepted the fact that collective efficacy is volatile due to variance among community members about the "effort they put into their group endeavor, their staying power when collective efforts fail to produce quick results or meet forcible opposition, and their vulnerability to the discouragement that can beset people taking on tough social problems" (p. 76). Nevertheless, protective actions in response to high risk and crisis situations

are, to a large extent, collective in nature. Thus, further analysis of the communicative efforts intended to inspire protective actions at the community level is warranted.

Previous studies in health-related crises have noted the effectiveness of collective efficacy. For example, Matsaganis and Wilkin (2015) saw effective communication as a means for creating resourcefulness through collective efficacy that improved access to healthcare in areas where such access was otherwise lacking. Similarly, Fong and Chang (2011) found a relationship between collective efficacy and community action in Taiwan's response to the SARS epidemic. Soares (2018) observed the central role of messages appealing to collective efficacy in Brazil's health communication campaign to control the spread of Zika virus. Reynolds and Quinn (2008) noted that communication intended to galvanize collective public action requires an "open and empathetic style of communication that engenders the public's trust" (p. 13S). A notable element of communication that has not been studied in existing research on collective efficacy during crises, however, is that of messages directed to children.

For collective efficacy to reach its potential, particularly during pandemics, children must participate in the recommended protective actions. Previous research focusing on collective efficacy for children has shown that high levels of collective efficacy "may have a protective effect on children's anti-social behavior" (Odgers et al., 2009, p. 18). Similarly, Smith et al. (2013) observed that children's perceptions of collective efficacy in the form of connectedness increased their prosocial attitudes and was related to a decline in problem behavior. Likewise, teachers of young children who exhibit collective efficacy through the belief that they and their colleagues can have a favorable impact on the children they teach is positively associated with student success (Goddard et al., 2004; Parks et al., 2007). We argue that credible agents such as the PBS have the capacity to evoke collective efficacy in children by sharing the essential traits of empathy, caring, and competence (Reynolds & Quinn, 2008). Specifically, we assert that the *Meet the Helpers'* response to the novel coronavirus pandemic provided a credible and emotional instructional appeal for children to engage in appropriate collective efforts to contain the spread of the disease.

Meet the Helpers Meets COVID-19

In 2018, WUCF received funding from the Corporation for Public Broadcasting to explore the impact of *Meet the Helpers* and develop new content. The original timeline for this initiative included the original crisis communications research, as well as a separate national study of the impact *Meet the Helpers* could have on anxiety and stress during emergencies and times of crisis with partner PBS stations around the country. From this national research, WUCF had planned to create three new helper videos for nationwide distribution.

As 2020 began to unfold, WUCF started discussing potential implications if the novel coronavirus grew from an epidemic to a pandemic. WUCF knew the programming and engagement staff would need to act if the virus spread to the United States and determined that *Meet the Helpers* was a useful tool for communicating to children and families about a crisis of this nature. The established messaging format and brand of *Meet the Helpers* gave WUCF a platform to create and distribute new content related to the coronavirus.

In mid-February, the WUCF content team drafted coronavirus-specific segment outlines for new *Meet the Helpers* videos based on early information from the Centers for Disease Control and Prevention (CDC) about the virus. Using an established content-development process, the scripts were edited with input from subject matter experts in early childhood education, crisis communications, and other topic-specific advisors. In early March, the WUCF team participated in a call with the Corporation for Public Broadcasting to brainstorm potential ideas for further extending *Meet the Helpers* in light of this pandemic.

By March 15, 2020, WUCF had launched a new coronavirus page for families on the website, as well as two new *Meet the Helpers* videos. WUCF secured additional funding from the Corporation for Public Broadcasting to transition the entire television station to work remotely from home. Over the next few weeks, WUCF would produce an entire series of nine new *Meet the Helpers* videos: What is a Virus?, What is Coronavirus?, How an Epidemiologist Helps, Wearing a Mask, Wash Your Hands, Be a Helper, Explaining Social Distancing, How to Talk to Children, and Coronavirus Do's & Don'ts for Parents (see Table 8.1).

Videos were distributed through the public media system, social media, individual station websites and television channels, and PBS LearningMedia and station partners. The public media system is a network of independent television and radio stations across the country which serve the same mission, i.e., to support the communities in which we live. Stations regularly share content for all platforms. This was the original plan with *Meet the Helpers*, namely to create something that can be shared by other public media stations, to help build stronger communities. These new videos were shared with other PBS stations. WUCF partnered with PBS to host a webinar about the toolkit, promoting it in public media newsletters and reaching out to station leadership across the country to educate them on the available tools. WUCF also created a social media campaign, targeting the *Helpers* videos to areas hit hardest by the coronavirus.

By March 24, the station launched two Facebook ads using the social distancing and epidemiologist videos. The social distancing ad was targeted at parents and educators of elementary school-aged or younger children in California, Florida, New York, and Washington, as those were the hardest hit areas at that time. The epidemiologist ad was targeted at parents and educators of elementary school-aged or younger children across the United States. Parents and educators were targeted in this campaign as we know the video's target age group (ages 3–10 years) are not on social media. WUCF also wanted to encourage adults to have these conversations with any children in their lives about these important topics. For these videos, WUCF monitored reach and impression numbers. Reach shows how many people viewed the content at least once when it appeared on their screen. Impressions are the number of times the content is displayed, no matter if it was clicked or not. These are important metrics to track in that it lets us know if we are reaching our target audience and also to understand if they are engaging and clicking on the content.

Each ad ran for 20 days with the following results:

- Explaining Social Distancing
  - Reach: 1,106,177
  - Impressions: 1,692,800

Meet the Helpers
Sponsored
We know it's hard to talk to children about keeping their distance, this video can help explain why social distancing is important.
What is social distancing?
MEETTHEHELPERS.ORG
How to Talk to Your Kids About Coronavirus
LEARN MORE
Kristin Donne... 2 Comments 25 Shares
Like
Comment
Share

Source: Explaining Social Distancing.

- What is an Epidemiologist
  - Reach: 1,416,703
  - Impressions: 1,985,615

After the initial campaign, WUCF realized that the coronavirus was affecting people across the country, not just the hardest hit areas. On April 13, a second campaign was launched. This time, three videos were used. The Wearing a Mask and What is the Coronavirus ads were targeted at parents of elementary aged or younger children across the United States, and Mister Rogers—Thanks to the Helpers targeted at helpers such as firefighters, nurses, doctors, and other first-responders. These ads generated a total reach of 1,388,033 and 2,572,533 impressions.

Analysis

Although WUCF continues to adapt existing *Meet the Helpers* videos and create new videos focusing on the coronavirus, this analysis focuses on the first nine videos produced in their original form. More specifically, we employ the IDEA model to illustrate how the videos move from internalization and explanation to both individual action and collective efficacy.

Seven of these videos target children and two target parents and caregivers. The two that target adults—How to Talk to Children and Coronavirus Dos and Don'ts for

Source: After the initial campaign.

Parents—are still focused on helping children in that they serve as tools for parents and caregivers to communicate most effectively with children about COVID-19. All the videos emphasize the most widely recognized means for stopping the spread of the virus. To clarify, each video essentially reminds children that they can be a helper by getting enough rest, coughing or sneezing into a tissue or their arm, washing their hands, and staying close to home. The videos do so by sharing a similar (convergent) message coming from different sources/spokespersons/helpers (peers, doctors, educators, and parents/caregivers). The following paragraphs highlight how the videos holistically address the elements of the IDEA model to communicate effectively to children about the coronavirus in ways that empower them to take appropriate actions both for self-protection and collectively as part of a larger community of helpers.

Internalization

Internalization is implied in the videos targeting children as the videos are responding to a pandemic they already realize is in their own neighborhoods (proximity) and could make them or someone they care about very sick or even die (impact). Thus, the videos targeting kids directly devote most of their time to explanation and action. However, the two videos targeting parents and caregivers do provide direct advice for reassuring children worried about getting sick. Specifically, the videos encourage parents and caregivers to engage children in conversations about the virus (How to Talk

to Children) and provide advice on what to say and not to say (Coronavirus Dos and Don'ts for Parents). Holistically, then, the video series addresses internalization sometimes directly and other times indirectly based on the target audience and desired outcomes for the specific video topic. In all cases, however, the goal is to motivate viewers to serve the community as helpers during this pandemic.

Distribution

Meet the Helpers was distributed through a variety of channels with a consistent message about what the coronavirus is and how to stay safe and healthy. Moreover, the campaign created a two-step distribution model by also using legacy media and social media channels to point receivers to the actual videos. Finally, the distribution format also varied. Narrators alternated among the videos featuring real people and cartoon characters representing a variety of professions, sexes, and races/ethnicities. Presentational aids were also adapted based on the subject matter. Some videos featured actual helpers dressed in professional attire and donning tools of the profession. Other videos featured cartoon imagery of action steps to be taken to avoid getting sick (e.g., washing hands, and using a tissue) or when someone they know is sick (e.g., sending a card and dropping off a meal). These strategies encourage collective efficacy by showing the many different kinds of people that can be helpers, including children.

Explanation

Sharing accurate information in a way that is comprehendible for the intended audience is fundamental to effective explanation in instructional risk and crisis (Sellnow & Sellnow, 2019). In this case, the target audience is children, either directly or indirectly (through parents and caregivers). Although all videos address explanation, the three that emphasize it are What is a Virus?, What is Coronavirus?, and How an Epidemiologist Helps.

To answer questions about what a virus is generally and what the coronavirus is specifically, for example, a medical doctor compares them to colds and flus, which are familiar to most children. Moreover, children are told that viruses are too small to see and that they can live on things we touch such as doorknobs or tables, which is why it is so important to wash hands often (internalization). More complex is the explanation that these viruses can also travel through the air on tiny droplets when someone sneezes, coughs, or even talks. The doctor acknowledges that it may sound "scary" (internalization) and assures viewers that he is one of many helpers working to make people feel better and that most people do not get very sick or stay sick for very long. To stay healthy themselves, children are reminded to cover their sneezes and coughs. However, the children are further reminded that they are also "helpers" because they will be reducing the chances of spreading the virus to other people in their neighborhoods. In this way, the video makes an appeal for collective efficacy in terms of not just helping themselves but also others.

Viewers are introduced to another helper in How an Epidemiologist Helps. The epidemiologist explains what she does by using a metaphor—disease detectives—including a magnifying glass revealing cartoon character germs for visual support. She then

goes on to say that she studies "how people get sick and how to stop the spread of germs." Finally, she explains how kids can be "germ busters" when they practice social distancing and stay home from school. She reminds them that if they do so, eventually they will get back to doing the things they used to do like going to school and playing with friends. Thus, what they are doing now is not just helping themselves but their friends, as well.

Action

Having laid the groundwork through the videos about viruses and the coronavirus by the doctor and epidemiologist, the next four videos build on this foundation by focusing primarily on specific actions children should take to stay healthy and help stop the spread of the virus. These are Explaining Social Distancing, Wearing a Mask, Wash Your Hands, and Be a Helper When Someone is Sick. The final two videos target parents and caregivers with action steps about what to say and do for children. These are How to Talk to Children about Coronavirus and Coronavirus Dos and Don'ts for Parents.

Social distancing is described as "taking a break" from school and other activities. Children are reminded that helpers everywhere are practicing social distancing. The adult narrator explains that we share germs with others when we visit them, but we keep our germs to ourselves when we stay at home. The kids respond with shouts of "yay." An animated portrayal of a sick person visiting others and making them sick is contrasted with a video of the person staying home and keeping others healthy. The narrator concludes by emphasizing that social distancing makes things different, but this process is necessary to "keep you and others healthy." Children are invited to be germ busters who collectively help us all get back to the activities we enjoy.

Wearing cloth masks is portrayed as a way to stop the spread of germs. A cartoon illustration shows that masks can look different. The child narrator explains that when we breath, sneeze, cough, or talk, tiny droplets containing germs, like viruses, float through the air and can make other people sick. Children are invited to be germ busters by wearing cloth masks like the one the girl in the video is wearing. The video also reminds viewers that medical masks should be reserved "for helpers like doctors and nurses who are working to make people feel better." This appeal for selflessly leaving the medical masks for the medical helpers puts an added emphasis on collective efficacy.

Handwashing is perhaps the most familiar topic children hear about in the *Meet the Helpers* coronavirus video series. The Wash Your Hands video begins with a child narrator emphasizing that handwashing is always important to staying healthy and especially after going to the bathroom, before eating, and after blowing your nose. These general reasons are accompanied by cartoon images and audio reinforcements (e.g., toilet flushing and nose blowing). The video shows children washing hands (wetting, lathering, rinsing, and drying). Finally, the narrator reminds them to sing "Twinkle, Twinkle, Little Star" while doing so. Although collective efficacy is not mentioned specifically, handwashing is one of the consistent strategies mentioned throughout the video series as an essential step in being a germ buster for everyone. Thus, the collective nature of the handwashing recommendation is implied throughout the video series.

Table 8.1 Appeals to collective efficacy in meet the helper coronavirus videos.

Meet the Helpers Video	IDEA Emphasis	Message of Collective Efficacy
What is a Virus? A doctor explains what a virus is and how children can help stop the spread.	Explanation	Viruses give us colds and flu. They are too small to see, and we can spread them through the things we touch and droplets in the air.
What is Coronavirus? A doctor explains the coronavirus and gives advice to children on how they can help.	Explanation	Coronavirus is making people sick, but that it does not last long for most people and that helpers are here to help people feel better. Children are reminded what they can also do to be helpers.
How an Epidemiologist Helps An epidemiologist introduces what they do as disease detective helpers to work to stop the spread of the coronavirus.	Explanation	Epidemiologists are disease detectives. Children are reassured that changes in their daily activities due to social distancing are to help keep them and others healthy.
Explaining Social Distancing Cartoon children and an adult voiceover illustrate the importance of staying away to stay healthy.	Action	Social distancing means keeping our germs at home instead of spreading them to others who might become sick.
Wearing a Mask A young helper encourages kids to be germ busters by wearing a cloth mask when they are out in public.	Action	Masks stop us from spreading germs when we breath, talk, sneeze, or cough. Be a germ buster by wearing a cloth mask.
Wash Your Hands A young helper shows kids how to wash their hands and explains how this helps others.	Action	Washing hands is the best way to stay healthy. Use soap and scrub your hands while singing "Twinkle, Twinkle, Little Star" (message delivered in context of being a germ buster for coronavirus).
Be a Helper A young helper shows viewers how kids can be good helpers during this time.	Action	We can help when someone is sick by making them a card, drawing them a picture, calling them, sending video message, or delivering a treat or a meal.
How to Talk to Children An educational professional offers tips on how to talk to children about coronavirus (what it is, how it spreads, how to stay healthy, and reassurance).	Action	Coronavirus is too small to see. You can help avoid its spread by washing hands, avoiding gatherings. Most importantly, many helpers taking care of us and the disease is mild for children.
Coronavirus Dos and Don'ts for Parents An educational professional shares how and what to say and do (and NOT say and do) when talking with children.	Action	Don't: be afraid to talk, share too much information, and leave TV on news Do: ask if they have questions, listen, be honest, keep consistent routines, remind them to wash hands, and reassure them.

In Be a Helper, a young helper reminds viewers that they can be helpers to others when they are sick with the coronavirus. She suggests making a card, drawing a picture, calling on the phone, or sending a video message with parents' permission. She also recommends helping a family by baking a treat or cooking and leaving a meal outside their door for people who are ill. Clearly, these actions recommend the collective nurturing of those who are suffering due to the coronavirus.

The final two videos feature tips from an early childhood expert about what to do and say to children about the coronavirus. The first video focuses on how to explain what coronavirus is in age-appropriate ways. The specialist also reminds viewers to reassure children about being cared for if they do get sick and that their symptoms will be mild. The second video focuses on actions in the form of a series of dos:

- Listen to their questions
- Answer questions honestly
- Keep a consistent routine
- Remind them to wash their hands

and don'ts:

- Be afraid to talk to children about coronavirus and answer their questions
- Overwhelm children with too much information
- Leave the television on news stories about coronavirus for extended periods of time

The videos recommend consistent strategies that, if applied collectively, can help children not only cope with the coronavirus but also be better helpers in the effort to manage the pandemic in their neighborhoods.

As a whole, *Meet the Helpers* provides a series of related strategies that can empower children to cope with the stress of the coronavirus and to engage in protective actions at both the personal and collective levels. Table 8.1 summarizes the general goal of each video, the IDEA element emphasized (explanation or action), and how collective efficacy is addressed and encouraged.

Discussion

Crises create windows of opportunity for young people to learn about threatening circumstances and community service (Schaffer, 2004). This examination of the *Meet the Helpers* initiative adds to our understanding about how practitioners and collaborating parents can envision crises such as the coronavirus pandemic as opportunities to teach their children about how science provides a pathway to both self-protection and community service. The *Meet the Helpers* series of nine short videos was distributed widely during the onset of the pandemic when uncertainty and the related need for learning were highest. Our application of the IDEA model has generated new insight into instructional crisis communication on two fronts. First, the study focuses on the lightly studied topic of crisis communication designed for children. Second, our analysis expands what is known about the role of collective efficacy in messages for self-protection. In so doing, this analysis extends IDEA model theory by illustrating how internalization may be represented depending on the audience, as well as how messages can move through the

elements of the model to appeal not only to individual actions and self-efficacy but also collective efficacy.

Perhaps most importantly, this analysis provides a pathway for adapting crisis communication to be comprehendible for children. As such, *Meet the Helpers* is an exemplar for effectively adapting crisis communication, particularly scientific content, to meet the literacy needs of children. The programming emphasizes the contribution children can make in managing the spread of disease during pandemics. Moreover, the collective appeals in the *Meet the Helpers* videos align with the emotional need Fred Rogers observed when he originally asked his young viewers to look for the helpers in threatening situations. Finding helpers means children are not alone in facing fearful circumstances. By working together with helpers, children and adults collectively cope with or respond to the crises they face. Thus, there is comfort for children who comprehend and respond to messages inviting them to engage in collective efficacy.

The expansive adoption of the *Meet the Helpers* programming nationally is evidence of its appeal. Moving forward, WUCF plans to continue developing content for Meet the Helpers. Three new Helper videos have been funded and will be released following the completion of WUCF's Youth Anxiety and Stress research, which will be conducted in Fall 2020. Anticipated videos include a mental health professional, a youth helper, and a to-be-determined Helper.

WUCF also anticipates continued fallout from the pandemic could inform additional videos as societal and medical guidance attributable to the coronavirus continue to evolve. WUCF expects to update videos around social distancing, health/hygiene guidance, and other critical helpers as needed. PBS stations around the country have also expressed interest in developing region-specific helper videos such as ski patrol and customs/border agents. These videos could be added to the national project as well.

Future research involving the *Meet the Helpers* initiative could be expanded upon using videos combined with imaginative play, role playing, or other activities to reinforce action steps youth can take to assist each helper during emergencies. Other expansion ideas include making this material available to children via mobile devices, in a game format or a video library. Future research opportunities could involve producing content for older youth.

Although the IDEA model has demonstrated its utility across crisis types and settings to achieve affective, cognitive, and behavioral outcomes, and increased self-efficacy regarding the enactment of appropriate protective actions, this study offers clear evidence that action should be measured not only in terms of efficacy for the protection of self but also the role of collective efficacy for the protection of the larger community. As we discussed at the outset of this analysis, employment of appropriate protective actions often depends on the collective willingness of communities to engage in the prescribed behavior. This examination illustrates how the IDEA model may be expanded to move from internalization and explanation to actions addressing both self- and collective efficacy. The ways in which *Meet the Helpers* does so successfully could be extended to other risk situations and crisis events. To clarify, in addition to pandemics, adherence to recommendations for evacuation during floods, fires, and hurricanes; preparing in advance rather than rushing to buy or hoard supplies in the days before the arrival of hurricanes; and vaccinations to avoid outbreaks of preventable diseases such as measles and whooping cough are some other examples of how

the action step in the IDEA model can be extended to include collective willingness to adopt recommended behaviors. This analysis suggests that collective efficacy ought to be considered when designing messages and when measuring outcome achievement. Furthermore, this analysis suggests that appealing to both self- and collective efficacy may be a better way to achieve desired outcomes not only when targeting children regarding a virus like COVID-19, but also when targeting other populations about other risks and crises (Donohoo et al., 2018).

A second potential area for clarifying the IDEA model revealed by this analysis is the potential for convergence among messages distributed to distinct elements of the intended audience. Previous applications of the IDEA model have depicted message convergence as consistency in the content distributed to a broad audience. While this is certainly true, results from this study suggest that convergence can also be characterized as an adaptation of content to fit the specific needs of various audience segments, in this case, children, both directly and indirectly (through tips and tools for parents and guardians). This is true for dealing with health pandemics such as COVID-19 (Zerwekh, 1991), and may be relevant to other risk situations and crisis events. Although COVID-19 is less threatening for children, concerns about their role in spreading the disease were paramount throughout the most acute phases of the pandemic (Mandavilli, 2020). This fact posed a crisis communication challenge. Children are essential players in the collective effort needed to slow or stop the spread of COVID-19. Yet, communicating the science of the virus to children requires considerable adaptations. *Meet the Helpers* is an example of how convergence can be maintained in crisis messages that are first designed for adults and then translated to be comprehendible to children. Our analysis revealed that the primary messages of how viruses spread and why wearing a mask, practicing social distancing, and washing hands are necessary to stopping the spread of coronavirus can be adapted to comprehendible levels for children without losing the essential elements of message convergence. Future applications of the IDEA model should consider the degree to which convergence can be maintained when messages are adapted to various subgroups of a broader audience.

Additionally, this analysis suggests that convergence among channels may be embellished by incorporating diversity into the messages themselves (Cozma, 2006). The *Meet the Helpers* videos did so through diversity in terms of primary sender (e.g., doctor, adult, and child) and visual images (e.g., cartoon characters, real people, pictures, and diagrams) (Seo et al., 2013). More research ought to explore how diversity of distribution channels might be expanded to include diversity in message design while maintaining a convergent theme.

The application of the IDEA model to the *Meet the Helpers* program also provides further support to the claim that crisis messages can provide sufficient internalization, explanation, and recommended actions in succinct messages. Previous research has confirmed, for example, that early warning messages in case of earthquake can include all elements of the IDEA model in a matter of seconds using a smart phone app (Sellnow et al., 2019). The *Meet the Helpers* videos are all less than a minute (30–40 seconds) and address all aspects of the IDEA model. The viability of these short messages, intended to fall within the attention span of children, suggests that crisis communication practitioners should explore distributing messages of varying length via a wide range of communication channels, including new media applications whose affordances limit the amount of space and time available for transmission.

The *Meet the Helpers* initiative serves as a lasting tribute to the victims of the Pulse nightclub shooting and the WUCF employees who mourned their death and sought to help their community heal. The employees who saw the need for crisis messaging designed for worried children created a format that is both effective and adaptable. Fred Rogers' reassuring message that we can always look for the helpers in our times of struggle is astute advice for children and adults alike. Perhaps ironically, the programming and engagement staff at WUCF, who sought to draw the attention of children toward helpers, have themselves become notable helpers in these perilous times of the coronavirus pandemic.

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9

The Use of Telehealth in Behavioral Health and Educational Contexts during COVID-19 and Beyond

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The ways in which we connect with people both professionally and socially have dramatically changed with the onset of the COVID-19 pandemic. Many have had a crash course in learning how to navigate videoconferencing platforms and reconceptualizing their work in order to stay connected with colleagues, maintain businesses, manage offices, and deliver an array of services that include medical and behavioral health and education. Others have already been providing services and conducting business in this manner and are now saying, "Welcome to the party." And they would be right, although the extent to which those who were already doing their work online or remotely has likely increased and shifted for them as well. Specific to behavioral health and educational-based services, the use of technology to deliver treatment and instructional support (i.e., telehealth) is not new. In fact, there is an impressive body of research that demonstrates that mental health and educational services can be effectively delivered using a technology platform including but not limited to videoconferencing (Hilty et al., 2013; Hubley et al., 2016; Ruble et al., 2018). Moreover, telehealth (or telepractice, telepsychology, or telemental health) was specifically developed to overcome barriers of treatment access for individuals who have difficulty gaining access to specialized in-person services. It has also been touted as more convenient and offering cost-benefit for both the provider and client/patient/student (e.g., Langarizadeh et al., 2017; Morland et al., 2013).

Despite the encouraging research and touted advantages, behavioral health specialists and special education service providers have been reluctant to fully embrace these services (Glueckauf et al., 2018). Some reasons are easier to address than others. Reasons include discomfort with technology, an assumption that telehealth services are inferior, lack of training, concerns about confidentiality, difficulty adapting services for certain presenting issues and populations, and simply preference. COVID-19, of course, has changed everything. With no option to meet in person, telehealth has gone from becoming a secondary option to a staple delivery format for those in behavioral health and other specialized educational services. We believe that even

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after the pandemic eases, the use of telehealth is not likely to recede to pre-pandemic levels. Anecdotally, we have heard that some of the benefits of using telehealth include seeing increased profits in mental health practices (e.g., fewer "no shows"), clinical benefits (e.g., seeing the client/student in their home and other natural environments), and recognizing that the convenience of telehealth may outweigh in-person benefits.

In short, we believe that telehealth services are likely to see a permanent expansion due to COVID-19. A better understanding of how COVID-19 has impacted service delivery and the circumstances and processes by which telehealth has been effective or ineffective is critical for helping to ensure effective, competent, and ethical service delivery is provided. In this chapter, we provide an overview of how COVID-19 has impacted service delivery for behavioral health and education specialists. Although it is exciting to see the proliferation of telehealth services, many service providers transitioned to such services without receiving adequate training. And telehealth is not a panacea for all service deliveries. For instance, interventions with children with autism spectrum disorder (ASD) or intellectual and developmental disabilities (IDDs) may not be appropriate as a stand-alone treatment format and/or may need to be significantly modified to be beneficial in a different format. The purpose of this chapter is to address some of these issues and to serve as an introduction to helping professionals who wish to learn more about telehealth service delivery in behavioral health and educational service contexts. We also offer supporting research and practical suggestions for utilizing technology for these service delivery settings beyond the current pandemic. For delivering behavioral health services, we consider only the psychological service of individual psychotherapy although group therapy and psychological assessment are both services that are also relevant and important to consider. Space simply precludes doing so. Then, we consider telehealth in an educational context. Specifically, we discuss telepractice for early childhood interventions and for children with ASD and IDD.

Telehealth in a Behavioral Health Context—Telemental Health

The COVID-19 pandemic has had a profound influence on daily life, with no end in sight, leaving many in a state of uncertainty. For many, this uncertainty is associated with a corresponding increase in mental health difficulties. For example, increases in anxiety, depression, substance use, loneliness, and domestic violence are just a few of the possible ramifications of the ongoing pandemic (Tull et al., 2020). Furthermore, certain populations are likely to be disproportionally impacted by the pandemic. For example, individuals with preexisting anxiety disorders, phobias, and obsessive-compulsive disorder may experience increased distress. Mental health difficulties may be further exacerbated by sociodemographic factors, such as unemployment, level of wealth, and social status. Indeed, preliminary data indicate that minorities and individuals from lower-income neighborhoods are incurring higher rates of traumatic stress due to the pandemic (Boyraz & Legros, 2020). Thus, it is critical for mental health professionals to find effective ways to attend to the mental health needs of individuals, especially higher risk individuals. In this section, we introduce the concept of

telehealth, identify challenges and barriers to its implementation, and provide recommendations and resources for the use of telehealth in practice.

The spread of COVID-19 has been associated with an emergent need for healthcare professionals to modify their provision of mental health services. Telehealth encompasses the use of a range of technological interventions (e.g., apps, text messages, videoconferencing). Telemental health (TMH) is one approach within the larger realm of telehealth in that it represents the use of communication technology to provide mental healthcare (American Psychological Association, 2013). There are three main types of TMH services: unguided (i.e., self-help), guided by a trained professional, and technology-based therapy (e.g., psychotherapy via videoconferencing; Berger, 2014).

All three forms of TMH have been successfully implemented across a wide range of mental health conditions and multiple clinical settings (Bashshur et al., 2016; Hilty et al., 2013; Hubley et al., 2016). Furthermore, TMH has demonstrated effectiveness with diverse populations, including Latinx (Chong & Moreno, 2012; Moreno et al., 2012), Asian (Ye et al., 2012), and Native American (Weiner et al., 2011). There is also evidence of the effectiveness of using telemental services among linguistically isolated populations (Jang et al., 2014) and individuals with various ability statuses, including hearing impaired (Hilty et al., 2013) and physical disabilities (Bashshur et al., 2016).

Despite growing research demonstrating its efficaciousness, research indicates that TMH was underutilized by clinicians prior to the pandemic (Glueckauf et al., 2018). This discrepancy was likely due to the challenges and perceived barriers associated with implementing TMH services. Given that clinicians are now forced to overcome these challenges and barriers, we discuss some of them below.

Challenges and Barriers to Implementing Telemental Health

Clients' Attitudes

Clients' attitudes about psychotherapy are likely to play an important role in their initial help-seeking behaviors, as well as their engagement in the therapeutic process (Ajzen, 1991; Holdsworth et al., 2014). Increased client engagement is associated with better client outcomes (Carpenter et al., 2019; Holdsworth et al., 2014). Thus, clients' attitudes about TMH are an important consideration for increasing the use of these services. Clients' attitudes toward TMH are measured broadly, encompassing acceptability, preferences, and willingness to use. Research indicates that clients generally hold positive views about TMH services (Apolinário-Hagen et al., 2018). Moreover, clients' perceptions about the acceptability of TMH services seem to improve with exposure, with past users reporting significantly higher acceptability compared to first-time users (Gun et al., 2011; Mitchell & Gordon, 2007). Yet, clients still seem to prefer face-to-face therapy (Gun et al., 2011; Klein & Cook, 2010; March et al., 2018; Renn et al., 2019; Wallin et al., 2018). This preference is likely related to concerns about confidentiality, beliefs about effectiveness, and concerns about the impact of diminished contact (Petersen et al., 2020). We discuss how to address some of these concerns later in the chapter.

Providers' Attitudes

Another equally important consideration is therapists' attitudes about TMH. Indeed, therapists' expectations about treatment outcomes have been linked to actual client outcomes (Swift et al., 2018). Therefore, therapists' expectations about

using TMH services could influence the effectiveness of these services. Some of the most common concerns that therapists express about TMH include technology difficulties, trouble detecting clients' nonverbal cues, and difficulties associated with forming and maintaining a strong therapeutic alliance (Connolly et al., 2020). Therapists have also endorsed concerns about the appropriateness of TMH for certain populations, such as hearing impaired (Connolly et al., 2020). Many of these concerns seem to decrease with greater exposure to providing TMH services (Adler et al., 2014), but this improvement is likely related to several factors (e.g., training, therapists' theoretical orientation, type of agency; Connolly et al., 2020).

Other Challenges and Barriers

There are a host of other issues that influence the adoption of TMH. They include the physical limitations of telehealth, technology access, insurance, and limited research with newer technologies and with racially and socioeconomically diverse populations. Each of these issues is discussed below.

TMH can be delivered in many different formats, but each poses physical limitations compared to in-person treatment. From texting (no visual or auditory) to phone-based (no visual) to videoconferencing (both visual and auditory), each of these formats has evidence of being effective, but each format has little evidence of how these limitations influence treatment outcome. For example, even with videoconferencing, many aspects of therapy may be missed or limited that may be clinically relevant. These can include body movements (e.g., restless legs), properly assessing appropriate eye contact, and hygiene. And, regardless of the format, it is impossible to get any data from odor. Additionally, nonverbal and verbal cues are restricted in varying degrees, especially for therapy conducted over text messaging or through the telephone.

Access to technology and the Internet continues to expand. Data from the Pew Research Center show that in 2019, 90% of Americans used the Internet, 73% had home Internet access, 96% had a mobile phone, and 81% had a smart phone. While these statistics demonstrate widespread access, a population of individuals without access to these technologies remains. Furthermore, even among those with access to technology and the Internet, they may experience other challenges, such as having to share their device with family members or poor Internet connectivity/connectivity disruptions. Lastly, prior to the pandemic, many insurance providers restricted coverage based on the type of TMH and characteristics of the consumer (e.g., only rural clients). Although insurance coverage for TMH has expanded and become less rigid, the coverage continues to be in flux and varies state by state.

Technology products are continuously being developed and updated, making it difficult for research to stay up to date. Additionally, research has focused on the overall effectiveness of TMH, while little is known about the nuances of TMH processes. For instance, research has shown that text-message-based therapy leads to improved client outcomes (Hull & Mahan, 2017), but we know very little about the specific components and process dynamics of telepsychology. For example, does the therapist's use of emojis impact the therapeutic alliance? Another limitation of TMH research is the lack of research on diverse populations. Although telehealth has been marketed as a

tool to reach underserved populations, most of the research has not been conducted on these populations (Ralston et al., 2019).

We are just beginning to understand the impact of COVID-19 on the use of technology for service delivery in the mental health field. For example, one impact is that clients/patients are more likely to be conducting their therapy sessions from home. Prior to COVID-19, clients may have conducted their telehealth therapy sessions at a virtual clinic, work, or other secure public spaces. Thus, clinicians must navigate the advantages and disadvantages of providing at home services. Some advantages include increased client convenience and comfort level, and the ability to get data about the client's home environment. Disadvantages may include difficulty finding a private space in the home, since many people are now homeschooling and working from home, and less reliable Internet connectivity. Further, although client's increased comfort level may lead to more intimate client disclosures and increased therapeutic alliance, it may also lead to boundary concerns and blur the professional relationship. Research is needed to evaluate how these advantages and disadvantages influence treatment processes and outcomes.

We are continuously learning more about COVID-19, and as a result, our response to this virus is also continuously changing. Clinicians must stay up to date on the evolving TMH guidelines and regulations for their states and specific discipline, including insurance coverage.

Recommendations and Resources

Prior to COVID-19, one of the biggest barriers to TMH was providers' attitudes toward, and lack of experience with, such services (Gershkovich et al., 2016; Glueckauf et al., 2018). However, the ongoing pandemic has pushed providers to incorporate TMH. There has been a growing acceptance of TMH services among clients, providers, and insurance companies. COVID-19 seems to have served to accelerate this acceptance given that exposure and experience with such services seems to positively impact attitudes toward use. Thus, it is probable that telepsychology will continue to be vastly used, even after the pandemic ends. This section provides mental health providers with recommendations for providing telepsychology during and following the pandemic.

1. Comply with Legal and Ethical Requirements

During the pandemic, there has been a shift to telehealth in order to provide safe, physically distant care. This shift has led to alterations in telehealth-related state and federal laws and regulations and insurance coverage and has encouraged an increased focus on ethical TMH guidelines. Further, telepsychology laws and guidelines can vary across states, organizations, and professions. Regardless of these complexities, it is critical to always be aware of the professional and legal responsibilities when providing TMH. The Center for Connected Health Policy—The National Telehealth Policy Resource Center—https://www.cchpca.org is a wonderful resource to stay up to date on state laws and reimbursement policies, legislation and regulations, and COVID-19-related state actions. Another great resource is APA's Guidelines for the Practice of Telepsychology, https://www.apa.org/practice/guidelines/telepsychology, which are

informed by professional theories, a multicultural lens, and evidence-based practices. Lastly, Maheu et al. (2018) developed seven TMH competencies and three levels of expertise (novice, proficient, and authority) in order to provide a standardized and quality TMH services across professions. All three of these resources will provide providers with the foundational knowledge needed to provide TMH, but if there is doubt, one should consult with the appropriate professionals (e.g., licensing boards, ethical board, and attorneys).

2. Use Best Practices

As noted earlier in this chapter, technology comes with limitations. Luckily, many of these limitations can be minimized. Since videoconferencing is the most widely practiced type of TMH and the most researched, this section will briefly discuss the best practices for videoconferencing (we also provide a table at the end of this section). For more comprehensive guidelines, see the document created in collaboration with APA and American Telemedicine Association (ATA), *Best Practices in Videoconferencing-Based Telemental Health*.

For videoconferencing, therapists must be mindful of how they and their client appear on screen. It is critical to position the camera adequately to maximize the likelihood of attunement. For instance, the therapist should be positioned a few feet away from the camera, so that the entire upper body is on screen. The camera should be adjusted to eye level with therapist and client, which may require adjusting the height of the computer or desk chair. This avoids giving the domineering appearance of looking down on a client, or the more submissive appearance of looking up at a client. Further, the therapist needs to give the appearance of making eye contact. In order to do so, the object of attention (i.e., the client) should be placed close to the camera. This gives the appearance of making eye contact, while still being able to actually view the client.

It is also critical for the therapist to be cognizant of the background and to limit distractions. As in-person therapy, the therapist should be mindful of the space where therapy is being conducted. Since there is only a small space for the client to see, compared to an entire space, the therapist may want to be even more mindful of the environment. Minimalist backgrounds are typically preferred to limit distractions. Light sources should be facing the therapist, as opposed to being behind, to ensure that the therapist can be seen clearly.

Another aspect of videoconferencing that is critical is the audio quality. Audio quality is arguably the most important aspect of video-based therapy. Unless one is conducting a session with someone who has hearing impairments, communication can still occur without video, but without audio, it is difficult, if not impossible, to communicate. Thus, consideration of obtaining devices to improve audio quality, such as noise canceling microphones, may prove useful.

These recommendations also apply to clients. As opposed to in-person therapy, where therapy is provided in an office, with videoconferencing, the therapist has little to no control over the client's environment. The clinician should initiate a discussion regarding the expectations and boundaries of videoconferencing. For instance, the client should attempt to limit the distractions in their environment and find a safe and private space. Additionally, the clinician should also discuss the boundaries of video

therapy, or what the clinician considers appropriate. This may mean not conducting therapy when the patient is in their bed, intoxicated, or not wearing appropriate attire. Other discussed boundaries might include the availability of the clinician and appropriate ways to contact them outside of the session. Lastly, technology preferences and experiences should be discussed with the client. The therapist should know which modality the client would prefer. Perhaps, the client would rather conduct therapy through the telephone as opposed to videoconferencing due to an unreliable Internet connection. Further, the client's experience with technology can also provide valuable information on how much guidance and education they will need. Just because someone has little experience with technology does not mean they are not a good candidate for TMH.

Therapy conducted via videoconferencing may also require some creativity and forethought. Consider how paperwork, worksheets, and visuals will be administered and implemented. This may require sending information to the client ahead of time (through a secure means) or deciding on a platform or application that provide the desired functions. For instance, phone applications are available that provide clients with access to evidence-based activities and allow the therapist to have access to the client's data (e.g., daily mood and completed activities). Creativity is also required for assessing certain aspects such as hygiene. While it is not possible to smell the client's body odor, Maheu (2015) recommends asking to view the client's fingernails to assess hygiene.

Forethought is also required for preparing for any disruptions that may occur. Disruptions can include getting disconnected, having technological issues, or being interrupted by someone or something. It is essential to have a contingency plan for any disruptions, such as switching to a telephone call.

While videoconferencing is widely used, so are mental health apps. There are over 10,000 mental health apps (Carlo et al., 2019), and 1 in 5 people have one of these apps on their phone (Novotney, 2016). Unfortunately, the majority of these apps have not yet been empirically evaluated. The wide array of apps and lack of research support make it difficult for clinicians to recommend apps to their clients. To weed through these apps and find the best match, we recommend the following site, https://apps.digitalpsych.org. The creators of this website are not connected to any particular app, and the website is dedicated to helping individuals find the best app for them based on their preferences by using the APA's App Evaluation Model. Another reliable resource is the Veterans' Affairs apps, which are all free to use and created using evidence-based treatments. They even have an app called COVID Coach, which promotes increasing self-care and well-being during the pandemic. To find a list and description of all their apps, go to https://mobile.va.gov/appstore/all.

3. Prepare for Emergencies

In any environment where mental health care is being provided, an emergency plan is required. TMH is no exception. The remote aspect of TMH requires perhaps even more emphasis on emergency procedures. First, it is critical to have an understanding of both the clinician and client environments. Therapists should know their organization's emergency protocols and their legal and ethical responsibilities. For the client's environment, the clinician should know the address of where they conduct their

sessions, the contact information for the closest medical and psychiatric facilities, and an emergency contact person.

Second, we recommend having a written emergency plan that provides both local and national resources. The client's location may differ from the clinician, so being familiar with local resources may require some investigation. Further, the increased accessibility to providers may muddle the therapeutic boundaries and provide the illusion that the therapist is available 24/7. Therefore, providers should be clear about when and how to contact them in case of an emergency, who to contact if they are unavailable, and what formats of communication are off limits (e.g., social media).

Third, conduct proper screening and determine if a person is appropriate for telehealth-based services. As with in-person treatment, conduct risk assessments. Providers should also assess the client's location at every session in case an emergency arises. For instance, if the client is actively suicidal or starts displaying symptoms of a heart attack, clinicians should know where to send the emergency responders. Similarly, at every session, the therapist should also ask who is in the home with the client. This is not only important for privacy reasons, but also for emergency situations.

4. Consult, Consult, Consult

Finally, due to the fast nature of technology advancements, it is nearly impossible to keep up with the latest research and technology trends. Therefore, it is vital to consult with other professionals. Consultation may include consulting with colleagues who have experience using telehealth, and as stated in the first recommendation, when in doubt, consult with licensing boards, ethics offices or boards, and attorneys.

Other Recommendations

Based on our clinical experience, we provide a brief list of other recommendations that may be of benefit with clients when using TMH.

- Use of greater structure (e.g., focus, goals) than typically would be used in an in-person format
- Be transparent about the potential benefits and limitations of the technology format used
- Ask specific questions about things that cannot be obtained visually (e.g., what does your body posture look like right now? Although I can see you, I am wondering if I'm missing something about how you feel?)
- Be extra cautious with humor or other ways of communicating (e.g., relying on hand gestures) that are context dependent. Our experience is that communication that is layered and culturally dependent, such as humor, has a higher chance of being misunderstood over technology including a video-based format. Even, in this format, the nonverbals and facial expressions may not be as clear to help with interpreting. For example, one author (Reese) has learned that sarcasm can be more difficult to use and can confuse clients.
- Monitor outcome and alliance—get feedback from clients/patients to evaluate effectiveness in this new format. What do they like or not like?

Summary of Recommendations for Telemental Health Practice

Setting the Stage	Video Presence	Therapeutic Process
Assess if telemental health is appropriate for the client	Select a minimalist environment to avoid distractions	Use greater structure
Inquire about the client's previous history with telemental health	Adjust camera to be at eye level	Be transparent about benefits and limitations of the technology format
Establish a plan for loss of Internet connection	Check audio quality	Inquire about nonverbals that cannot be readily assessed
Obtain contact information from the client	Consider the use of headphones	Be extra cautious with humor or other ways of communicating (e.g., relying on hand gestures) that are context dependent
Obtain the client's current address	Avoid having light sources directly behind	Consider incorporating mental health apps
Confirm that both client and therapist are in private and secure locations		Get feedback from the client
Request that the client provide the contact information for a local individual in case of emergency		

Conclusions

TMH is an effective format for the delivery of psychotherapy services. Yet, concerns about TMH remain despite ample evidence regarding its efficacy. Doubts about TMH appear to be especially prevalent among providers. Provider engagement with TMH, however, can lead to more positive views toward it (Connolly et al., 2020), and with clinicians using it more than ever due to COVID-19, perhaps attitudes will shift. Although we find it exciting that the promise of TMH may be more fully realized, clinicians must recognize the limitations and the modifications needed to provide competent and ethical services. Clinical training and support with using TMH services are critical to helping with the shift to TMH for providers and clients. We hope this section will contribute to this shift with the guidance and recommendations we provide that address some of the commonly reported concerns regarding TMH services and increase the likelihood that providers will feel more confident about steps to consider in using TMH.

Telehealth in an Education Context—Telepractice

The use of technology to provide specialized services is, of course, not limited to psychotherapy. The COVID-19 pandemic also forced the educational system to abruptly transition to remote learning platforms for student. What has received less attention is

how the needs were being met for children and families who need specialized clinical and educational services. *Telepractice*, as it is often referred to in an educational context, has been increasingly used to provide service continuity during the pandemic. Below, we provide an overview of providing specialized services in an early childhood context and with students diagnosed with ASD and IDDs.

Early Childhood Education Services

Early intervention and early childhood education services involve activities and supports that improve child outcomes regarding cognitive, communication, social and emotional, adaptive, and motor domains of development. Activities and supports are provided for all families regardless of socioeconomic status (SES), race, disability, gender, and culture. Services are to occur in natural environments, include collaboration among multiple partners (e.g., caregiver, special instructor, therapist, and pediatrician), encompass culturally responsive practices, and be developmentally appropriate (Division for Early Childhood of the Council for Exceptional Children, 2014). Effective services are multi-tiered in which additional supports are based on children and families' specific needs (Division for Early Childhood of the Council for Exceptional Children, National Association of Young Children & National Head Start Association, 2013). Limitations in early intervention and early childhood services include inadequate financial resources, restricted transportation, lack of childcare, geographical isolation within rural areas, long waitlists, and narrow time commitments that impact family involvement (Meadan et al., 2013). There are also social disparities in the provisions of services. Specifically, intensity and type of service are documented to differ based on a family's educational level, income status, insurance, ethnicity, and whether the child had a diagnosis (Khetani et al., 2018). Khetani et al. indicated multiple examples, but we highlight a few here. They reported that children with a diagnosis or families with 12 years of education or less receive more intense services. They also reported that children and families who are Black are less likely to receive physical therapy but more likely to receive speech services compared to peers who are White non-Hispanic. Lastly, they found that children and families who were publicly insured received less intensive occupational therapy and speech services.

Currently, the implementation of early intervention and early childhood services are compounded due to the COVID-19 pandemic. Families have less access to social supports such as family members, friends, and neighbors and less opportunities for social interactions within community groups and activities. Material supports such as employment, insurance, training, supplemental funding, and technology are strained or not available. Therefore, early childhood professionals have to find creative solutions in which young children and families' material needs are met, have access to culturally responsive social supports, are able to collaborate with multiple individuals, and learn in a developmentally appropriate manner.

Research in Early Childhood that Uses Technology Platform for Service Delivery

Telepractice is used in providing communication and health services for families and has been shown to be an effective service delivery format, including increased services being provided and positive outcomes for children (Boisvert et al., 2010; Ingersoll et al., 2016). Telepractices range from self-guided instruction using DVD, online text, and

video modules to live, two-way video conferencing within individuals' homes, schools, or other remote settings with a service provider (Vismara et al., 2018). Although the findings are promising, research studies are scarce, are generally limited to educational-related services involving therapy, and predominately rely on single subject design methodology.

Much of the telepractice research in early childhood focuses on development of communication skills (Behl et al., 2017; Blaiser et al., 2013). Practices include coaching and consultation in which providers partner with caregivers in implementation (Meadan et al., 2013). Specific strategies documented in research involve naturalistic teaching methods embedded within a child's existing routine (Meadan et al., 2016). Caregivers demonstrated fidelity in the implementation of incidental teaching, modeling, demand model, and time delay. Practices of coaching and consultation include assessments in which test materials are mailed or come from the natural environment, conducting video observations or having caregivers record child interactions for observational purposes, technology training, interviews with family members and caregivers, guided practice in implementation of strategies, and reflection.

Examples of Implementation Strategies

Two examples of implementation strategies are provided. The first is an early intervention telepractice example and another is a school-based telepractice example. In the early intervention service provision, the caregiver receives services and implements the intervention. The early childhood school-based service provision is different in that the service provider works directly with the child, implementing instruction while collaborating with the caregiver.

The first example is early intervention. A service provider calls the caregivers and schedules a time to meet. During the phone call, the service provider asks caregivers about access to technology to ensure a telepractice meeting can occur. If the family has limited access, the service provider helps coordinate resources so that the family can access technology if it is required for the meeting. The first meeting involves gathering information and administering assessments so that a plan can be created. The service provider may ask caregivers and family members to gather recordings of the child so observations can take place prior to the first meeting. Service providers can choose assessments in which items from the child's natural environment are used. However, if an eligibility assessment mandates specific items for administration, the items are mailed to the family. After the assessment, the family is asked questions about their daily routines. The service provider asks questions to gain an idea of the daily life of the family and family tasks. After the interview, the family lists priorities for service provision, and a plan is written. A home visit is then scheduled. A telepractice home visit starts with showing the family their priorities and routines and prompting the family to choose which priority and routine they would like to focus on. Service providers can share their screen or have the family look at a hard copy that has been mailed. Once the family chooses the priority and routine they would like to focus on, the service provider will ask open-ended questions. Active listening techniques are very important because the service provider must have an adequate understanding of the need they want to focus on within the context of the family routine. Specifically, the service provider must understand the functional expectations of the routine and the ability of the child to perform the expectations if an appropriate strategy is to be suggested.

The service provider suggests a strategy and discusses it with the family. The service provider can describe the strategy in detail, show the family a module that illustrates the strategy, or demonstrate the strategy using video conferencing. The family is invited to implement the strategy, and the service provider observes giving feedback and praise. Some service providers use Bluetooth technology in which they speak with the adult providing the caregiver tips and advice freeing up the caregiver from the computer screen. This allows the caregiver more freedom to follow their child's lead, which is a best practice in early intervention. The service provider asks the family if the strategy is something they feel they are comfortable with and can implement. The service provider can mail information to the family about the strategy or to address any other questions or issues that arise in the session. The family and service provider then set goals for the next home visit. After the session, the service provider will follow up with the family through a phone call or text to check in.

The next example is school-based instruction. As stated previously, school-based instruction are services in which the professional delivers instruction directly to the child in collaboration with family members. Similar to early intervention, the service provider calls the caregivers and schedules a time to meet. During the phone call, the service provider asks family about technology access available to them. If the family has limited access, the service provider helps coordinate resources so that the family can access technology that is required for the meeting. The professional reviews school documentation to gain understanding of the child's academic and functional level as well as child preferences. The family may provide the service provider work samples and/or video recordings in which the professional can conduct observations. Based on the information gathered, the service provider will create lessons for the child. The service professional may mail hard copies of books, crafts with materials, or worksheets before the meeting. During the lesson, the child and family meet with the service provider. The lesson is explained to the child and family. The service provider models and asks questions or prompts the child to respond to check for understanding. The caregiver can assist the child to help the child have success with the lesson. At the end of the lesson, the service provider may have the child take part in an interactive game to provide practice of the skill or concept. The family can share their screen, and the service provider can provide prompts for assistance. After practice of the skill or content, the service provider summarizes the lesson with the child and family and assigns practice through online games or a project the child and family complete together using materials that have been mailed.

What We Have Learned

Due to COVID-19, families have less access to social supports, fewer opportunities for social interactions, and material supports for families may be strained. We have learned that telepractice is a way of reaching communities for early childhood services in which barriers exist. This is especially beneficial when individuals must quarantine or families have medical risks. Other barriers telepractice can help ameliorate are inadequate financial resources, restricted transportation, lack of childcare, geographical isolation within rural areas, long waitlists, narrow time commitments, limited personnel who specialize in service provision, and rescheduling missed appointments (Snodgrass et al., 2017). Telepractice for early childhood can be implemented in multiple contexts and can be a tool for coaching and consultation for families and professionals. With the

successes of telepractice, there are also challenges. Engaging in direct service provision with young children can be difficult. The child has to remain within view of the screen and maintain attention during the session (Snodgrass et al., 2017). Due to the inability of the service provider to follow the child in their environment and limited physical availability to prompt the child, sessions with direct services need to include collaboration with a caregiver. Technical difficulties can arise during sessions which require a skilled individual in technical assistance, and children may also need adapted equipment. It is important that researchers and professionals seek solutions to these challenges to expand the scope of telepractice in early childhood service provision.

Where Do We Go from Here?

Even though there are challenges in telepractice service provision of early childhood, the potential of telepractice is promising. Research and professionals should continue to study and create resourceful solutions that engage families and young children, yet also conform to best practices. As technology and technology access improves, new ways of implementation of services can come into fruition. It is important to discover developmentally appropriate ways to engage children in direct service provision that gains attention and improves prompting of responses. Methods to ensure technical assistance and support with adapted equipment need to be explored so that better options can be generated for families and children. In addition, researchers and service providers have to continue to create innovative telepractice services that address all domains of development.

Services for Children with ASD and IDD

Children with ASD and IDD often require quite intensive support from many different professionals such as occupational therapists, speech therapists, physical therapists, developmental pediatricians, psychiatrists, neurologists, and applied behavior analysis (ABA) therapists. Since the advent of COVID-19 resulting in the complete shutdown of in-person school, therapies, and medical appointments, services for many children with ASD/IDD have been discontinued or greatly diminished, and many diagnostic clinical appointments which cannot be conducted via telehealth have likely also been disrupted, delayed, or completely canceled (Amaral & de Vries, 2020). For children who receive services through the school system, there has been a complete disruption of routines, service provision, and support for families (Hill, 2020). These disruptions may have disproportionately affected children who live in rural areas, are Black and Latino, and are economically disadvantaged and less able to reliably access the Internet (McConville, 2020). Rural families report having to drive further for services and report fewer service providers and types of services (Mello et al., 2016). American families are also suffering from job loss or having to keep working as essential workers. Participation particularly in long and frequent sessions of ABA therapy may be onerous for families at this time. Many families have lost insurance coverage, which may have resulted in the discontinuation of ABA services (Dorn, 2020).

To compound the effect of COVID-19 on children with disabilities, research suggests that Black and Latinx children wait an additional year for assessments for and diagnosis of ASD when compared to their White peers (Magaña et al., 2013; Mandell et al., 2002), which is most likely exacerbated by the pandemic. For many children with ASD/

IDD, a diagnosis of ASD/IDD by a developmental pediatrician is required to begin any number of therapies and access county- and state-level services (Health Net Federal Services, n.d.; National Conference of State Legislatures, 2018; Oregon Department of Human Services, n.d.). These services can be "life changing" for families, and ABA in particular is one of few evidence-based practices to address communication, challenging behavior, adaptive skills, and other domains often needed by individuals with ASD/IDD (Bear et al., 2020; National Autism Center, 2015; Soke et al., 2016). ABA employs many strategies such as breaking a skill down into smaller component parts using antecedent, teaching, and consequence strategies to increase the likelihood of appropriate behavior and decrease the likelihood of problem behavior (Cooper et al., 2020).

Now that online instruction will stretch into the 2020–2021 school year in many areas of the United States, many parents are turning to homeschool options that will exclude children with disabilities, particularly those with challenging behavior or more significant learning difficulties like children with ASD/IDD (Tucker, 2020). The intersection of disability, race, and class can result in a compounding effect of disadvantages that are exacerbated by COVID-19 as many Black people and people of color are more likely to work essential jobs which make working from home and homeschooling impossible; are more likely to experience economic disadvantages related to ongoing systematic racism in the United States that make taking time off to home educate their children exceedingly difficult; and are more likely to have disabling conditions due to toxic stress, intergenerational trauma, and environmental racism that make death and further disability more likely from COVID-19 (Gould & Wilson, 2020).

For school-related services, the move to telehealth or remote instruction also presents specific challenges for special education teachers, particularly those that teach students with ASD/IDD who require specialized and intensive supports. Most teachers who provide instruction for students cannot provide even a small fraction of the support available at the school due to the individualized nature of the instruction provided. While a general education teacher can hold daily or weekly sessions with their entire class at the same time, provide online modules that students access at their own pace, and hold brief and infrequent one-on-one meetings with their students, this is impossible for many special education teachers. Students are therefore receiving minimal supports at home (Grayer et al., 2020). There are also logistical issues that families face such as lack of Internet service, the strength of WiFi, and lack of interpreters for families who speak languages other than English (McConville, 2020). At this time, there is no specific plan for school services in the fall 2020 related to COVID-19 at the federal or even state levels for any students, general or special education, but rather a list of recommendations. These recommendations include social distancing protocols, mask-wearing, increased hand washing, decreased class sizes, use of temperature screenings, and alternating schedules by officials and parents (CDC, 2020b). Some organizations such as the American Speech-Language-Hearing Association, American Occupational Therapy Association, and the Behavior Analyst Certification Board have issued guidance for their members, but they lack specificity at least partially due to the minimal federal guidance provided (AOTA, 2020; ASHA, 2020; BACB, 2020). In fact, some parents were asked to sign forms waiving their right to free and appropriate public education, which school districts have since walked back (Cohen & Smith Richards, 2020). Some other parents have been asked to sign waivers in case of the death of students (Stansell, 2020).

Research on Telehealth Provision of ABA for ASD/IDD

In some good news among the bleak proclamations about online instruction for children with ASD/IDD, there is quite a breadth and depth of research on telehealth for use with this population. ABA therapists have been using telehealth successfully for many years due to the relative rarity of Board Certified Behavior Analysts (BCBAs) compared to other professionals and the relative concentration of ABA practitioners in cities and in certain states based at least somewhat on insurance coverage and the presence of universities that train BCBAs (BACB, 2020). ABA practitioners have used telehealth to train parents, teachers, and teaching assistants to complete preference assessments, functional behavior assessments, functional analysis, language and communication interventions like functional communication training, social emotional skills, and pivotal response training, and other interventions with great success (Gerow et al., 2018; Pickard et al., 2016; Wacker et al., 2013; Wainer & Ingersoll, 2015).

These interventions have enabled students to learn new skills such as play and communication and resulted in decreased challenging behavior. The natural change agents (parents, teachers, and teaching assistants) trained by researchers and interventionists were able to implement a wide variety of procedures with high levels of fidelity (Unholz-Bowden et al., 2020). While this research suffers from the most common limitations of ABA literature such as a lack of generalization and maintenance and less research with older populations, overall, this research is strong and shows a benefit to the practitioner and the individual with ASD/IDD (Ferguson et al., 2019; Knutsen et al., 2016). In other words, some ABA practitioners and researchers have the expertise and interventions to teach and benefit individuals with ASD/IDD, and we are able to teach others to implement those interventions. Other practitioners have also used telehealth successfully to deliver services such as speech therapists (Sutherland et al., 2018). While there is less research on occupational therapy possibly due to limitations of equipment and the need for some "hands on" contact, there is still some positive research (Zylstra, 2013).

The specific means of training that is most commonly used by ABA practitioners is called behavior skills training. This method uses didactic training, modeling, role play, and feedback (Dib & Sturmey, 2012). Each of these components is critical and leads to high levels of treatment fidelity and corresponding behavior changes in children. Behavior skills training was used in each of the previous telehealth studies in which a parent, teacher, or teaching assistant was trained in a new intervention or skill. One concerning limitation of the current research on ABA and telehealth is the lack of tiered interventions in which special educators provide interventions via telehealth in a systematic way by either training teachers or intervening directly with a student.

Telehealth Challenges

The use of telehealth specifically for children with significant developmental disabilities can present problems for many reasons. One is due to the use of tablets, smart devices, and laptops for entertainment and communication purposes. Students may associate the devices with these other uses: communication, sources of YouTube videos, and use for applications such as Disney+ or ABC Mouse. Attempting to use these devices for learning purposes can result in challenging behavior and difficulty attending to instruction. One research article, for example, included interventions solely to address challenging behavior related to access to smart devices (Haq et al., 2018).

Possible remedies for this in the short term are locking the device so that only the teacher/therapist's screen is available or limiting the websites/applications available to the child during instructional times of the day. Additionally, if a child uses a device for communication, then a separate device should be used for instruction. Professionals may want to "color code" the different devices if they are similar. For example, the "school" iPad could have a blue case with a different shape/type than the one used for communication or entertainment.

Family factors may be another barrier with telehealth support by schools and professionals. Families with more children, parents who work, parents who speak languages other than English, or those who do not have the skills to use the technology required will experience more difficulties helping their child access instruction. Many professionals may not know how to work with interpreters or they may not be available, which is against federal special education law, but may still be commonplace (Acar & Blasco, 2018; IDEA, 2004). Some instructors may also feel uncomfortable providing feedback to parents or being directive to parents when working with their own child. Additionally, many districts are not providing the technology or Internet service required to participate in online learning.

Return to School Challenges

In addition to the challenges presented by the use of telehealth service delivery, many families and teachers are struggling with how to help their students access their education once they return to school. To start with, there is a high incidence of comorbidity between ASD/IDD and other physical and motor disabilities that may increase the impact of COVID-19 (Matson et al., 2011). Many families are making decisions about returning to work and returning their children to schools based on a cost-benefit analysis with incomplete information about risk with the CDC stating "There are more COVID-19 cases reported among children with intellectual and developmental disabilities than those without. People of any age, including children, with certain underlying medical conditions are at increased risk for severe illness from COVID-19. Additionally, children who are medically complex, who have neurologic, genetic, metabolic conditions, or who have congenital heart disease might be at increased risk for severe illness from COVID-19, compared to other children. Severe illness means that they may require hospitalization, intensive care, or a ventilator to help them breathe, or may even die." (CDC, 2020a).

As an additional barrier, many of the individuals with ASD/IDD may struggle to comply with the COVID-19 safety recommendations due to disability-related difficulties such as sensory sensitivities that make mask-wearing and hand sanitizing difficult, aversive, or physically painful; challenging behavior around compliance with adaptive skill/self-care routines such as hand washing and sanitizing and social distancing may be completely incompatible with effective instruction using physical prompting, changing proximity, and supporting students in tasks such as toileting and eating. ABA does have methods to address these issues, but they require a high level of advance planning and instructional and intervention skill and still carry quite a large amount of risk for teachers and students. One method by which district personnel can support parents to smooth the transition back to school is to train teachers to make online modules for parents for specific interventions for both ASD and IDD. Each of the interventions we describe in the following section can be broken down and

explained using video or online modules and implemented using behavior skills training, as discussed in the *Examples of Implementation Strategies* section. If schools require the use of face masks and other safety procedures, then the onus is on the school to support parents in teaching these skills prior to the student's return to school.

For face mask-wearing, an ABA intervention known as habituation or desensitization can be implemented by families or teachers. We would begin by completing a preference assessment to find the most highly preferred toys, foods, and/or activities (Vanderbilt Kennedy Center, n.d.). These will be used to reward the person for engaging in the appropriate behavior. The key to this intervention is to start small and meeting the child where they are. If a child will not even touch a mask, start with that. Then, one can progress to them holding it to their face. Then, one can start having the child wear a mask for very short periods of time. With each step, make sure that strong rewards or reinforcers are available for compliance with whatever step of the mask-wearing process is being addressed. Then, the amount of time expected is increased systematically. If the child expresses feelings of anxiety, the provider can also coach them in self-calming techniques as appropriate. After the child is wearing the mask successfully for some extended period of time, preferred activities such as trips out in public for treats can be made contingent on wearing the mask. This can also be stated as a rule or as a "first, then statement" like "First mask, then we go to the toy store" or "The rule is, we wear a mask at the toy store." Then, reinforcement shifts from contrived to naturally occurring reinforcement. This same process can be used to build tolerance for the use of hand sanitizer or other cleaning protocols. The parent or practitioner can begin by having a small amount of hand sanitizer on surface. First, reward the child for just touching the hand sanitizer with their finger. Then, slowly work up to accepting hand sanitizer being placed on the hands and rubbed all over hands to achieve maximum effect of the substance.

For self-care tasks such as hand washing, teachers and parents can use a procedure called task analysis with the support of visual or video prompts. This looks like breaking the task down into small parts: turning on the water, pushing down the soap dispenser, rubbing hands together, etc. Then, personnel can support the student using a picture of each step or a video of the process taking place in the same location with the same stimuli. Video modeling is another evidence-based practice for teaching individuals with ASD/IDD (NAC, 2015). Again, using reinforcement of the student's most preferred toys, food items, and activities as a reward for completion of hand washing will help the student master the skill more readily.

Other skills that may be amenable to reinforcement are the use of social distancing, staying in their "bubble" or designated areas in the classroom, and using their masks at the appropriate time (in group settings, in the hallway, or when they are working with a teacher). It should be noted that these interventions are not only effective for children with ASD/IDD but for all students. Posting visuals, teaching steps of handwashing, and rewarding complete and thorough hand washing are techniques that all teachers can implement in all classrooms.

What We Have Learned

From my personal experience (Drew) of providing telehealth supports to children who live in both small rural districts and larger city districts, there are significant barriers that families are experiencing as a result of COVID-19. There are notable equity issues

with the service provision for children with significant disabilities, who are medically fragile, or who engage in challenging behavior, and families who speak a language other than English. In my brief work with five families, two children were dismissed from programs, one from occupational therapy due to challenging behavior and another from a summer camp for the same reason. Two families were not receiving adequate services from the school districts prior to COVID-19, and that was further exacerbated once school was canceled. These families were only receiving sessions once a week with the special educator and a speech therapist with minimal instructional materials provided by the school. Both of these families spoke Spanish, and an interpreter was not provided nor were any instructional materials provided in Spanish. Another family had lost ABA services prior to COVID-19 and were unable to restart services for 6 months after the pandemic began. I provided bug-in-ear coaching to teach parents naturalistic interventions, communication, and to address challenging behavior during family routines. These experiences have shown how insufficient services are for children with ASD/IDD, particularly as they are just entering the system and if they are significantly impacted by ASD/IDD. Additionally, districts should be providing all technologies required for students in special education: hotspots, Bluetooth headsets, instructional materials from the special educator and all related service providers, and smart devices as needed. At this time, I cannot speak directly about the needs of the adolescent and adult populations during the pandemic. It seems likely that they are receiving even less support than their younger counterparts as supports have generally faded as students move through the system before almost completely disappearing at age 21 years.

In order to address the problems I have seen in my own practice, districts should also provide special education teachers and related service providers with training in coaching skills. Districts should also hire more professionals of all kinds in order to maintain the level of services called for in the Individualized Education Program (IEP) rather than altering them to fit the staff already in place. Districts should also support families in applying for services such as respite care/support for parents and caregivers who are overwhelmed.

Research is an area of need for this time of COVID-19. ABA does not have sufficient research to support or recommend for the use of teachers as interventionists via telehealth at this time. While there is one exemplar research study that shows the effectiveness of teachers as interventionists, this was a manualized intervention that may not be appropriate for all students or may require intensive training that is not available to the average special education teacher at this time (Ruble et al., 2018). Future research should support this with BCBAs supervising the work of special educators and potentially creating a manualized resource for special education teachers to use with their students in an online instructional arrangement. Research should also address the most efficient way to meet the needs of students with individualized support plans thorough intensive parent coaching that can be faded. Most studies on parent coaching in ABA do not provide sufficient information on generalization and maintenance of effects, which leaves questions such as how long should we keep coaching, should periodic fidelity checks be conducted, among others. There have been studies that have had parents record themselves conducting intervention sessions with the researcher for proof of full independence and to provide feedback as necessary. This may be another avenue for supporting parents available to school

personnel and specialists. As always, we should be conducting social validity checks for each type of intervention and modality of instruction.

Individuals with disabilities can be served effectively using telehealth modalities as is increasingly necessary since the beginning of the COVID-19 pandemic. Telehealth service provision has many limitations and practical barriers. Research in particular lags behind practice in the area of teacher training, addressing severe challenging behavior, and evidence-based approaches that are adaptable to a telepractice format. Researchers, practitioners, consumers, students, and parents are required to be flexible and many have taken this challenge head on.

Final Thoughts

The COVID-19 pandemic is a health crisis that has dramatically influenced the way many of us conduct and think about our professional work. For those of us who provide specialized mental health and educational services, we are fortunate due to the previous development and implementation of interventions using technology for a variety of cognitive, behavioral, emotional, and interpersonal issues across the lifespan. In short, we have had a nice head start. There is enough evidence to support that such services can be effective, and in some cases, just as effective as in-person for a variety of presenting issues.

At the same time, much of the previous service provision was relegated to rural areas or with those doing research. Technology-based services have quickly been scaled up to be used by a large number of practitioners now, many with little training, and it is unclear how those research findings generalize to current service delivery. For example, how do services need to be adapted in order to be culturally responsive?

We do believe that many clients, families, and students and their practitioners and educators have recognized the advantages of using videoconferencing and other technologies for service delivery. There will be a new normal. Although we believe there is no turning back in many ways, we do need to return to the basics of our disciplines that are grounded in competent and ethical service delivery—a foundation rooted in rigorous research and training. Service delivery using technology is a competence area and should be treated as such. Necessity is the mother of invention, but ultimately the successful integration of technology long term into the helping and education professions resides with a recognition that there is much more to learn to provide evidence-based interventions that are cultural responsive.

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Part 3

Advancing Models of Information and Media

10

Toward a New Model of Public Relations Crisis and Risk Communication Following Pandemics

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Overview

Research demonstrates that people on average will face a crisis every 10 years. What this crisis is, how large it may be, and the impact it has on us depend on several factors, including our ability to sense vulnerabilities, potential risk, and what we have done to prepare for that crisis. Further, crises can arise from natural causes, individual action and behavior, social expectations, and cultural differences in communication and behavior and can jump (migrate, morph) from and between, making crisis communication management not as "easy" or "predictable" as previously noted in the crisis literature. This chapter examines how the COVID-19 pandemic started much like other crises, especially those of a medical nature, and then examines how that pandemic crisis morphed from a "natural cause" (i.e., an animal virus transferring to a human virus) through miscues and missed opportunities to identify and mitigate vulnerabilities that allowed what was a medical crisis to morph into a socio-political, economic, and cultural crisis. It provides a non-linear model of crisis communication management and focuses on the impact of the social media in altering, advancing, and modifying the crisis over time.

Introduction

Pandemic crises are not a new phenomenon. History can trace pandemics based on viruses back centuries. Humans have been afflicted with pandemics ranging from the plague or Black Death to smallpox and polio to the flu (e.g., Spanish, Hong Kong), Ebola, SARS, MERS, and now to COVID-19. In almost all cases, the causes have leaped from nonhuman (e.g., fleas, chickens, pigs, and so forth) to human carriers. The fact is that science knows of the possibility of such pandemics, and

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organizations such as the World Health Organization (WHO) have reports available that, while not predicting specific pandemics, causes, or timeframes, they do note the transmission factors, the adoption rates, and of course the mortality rates. What crisis theory suggests is the equivalent of "environmental scanning," that is, looking for potential vulnerabilities and planning around them if and when they become crises. This scanning leads to programs that focus on intervention strategies to be employed once the crisis meets or exceeds the state "tripwire" or the conditions that move it into a crisis. From this point, crisis management moves to the underlying communication plan to control the crisis aftermath. That is, the crisis has occurred, and now we are in a management phase—through effective crisis management plans, coordinated communication with affected stakeholders and publics (e.g., governments, NGOs, employees, and so forth), and the review of implemented crisis plans and their impact on the crisis.

This notion of crisis communication management is not new. What is new is the focus on risk and risk communication. While a crisis responds to an event or thing, risk deals with the *perceived* impact (i.e., risk) of an event (defined as narrowly or widely as required in managing it). Typically, *the greater the risk, the greater the crisis potential*. But risk can also be seen as a crisis mediator, that is, as risk increases so too does the chance that the basic crisis being planned for will morph into other crisis types, such as those Lerbinger (2012) classifies as physical (natural or technological), human climate (confrontation, malevolence), and management failure (deception, misconduct). Hence, the crisis manager must be prepared for crisis leaps and setbacks as the crisis morphs through its life. Clearly, effective management of the crisis is when the crisis impact is limited, and really effective crisis management outcomes are the ones the public is not aware of.

How then can a crisis be managed once it has "tripped" the impact wire? Traditionally, this has been accomplished by an understanding that crises arise suddenly (even though we may have prepared for it, its onset often takes us by surprise and moves quickly in intensity), that it produces uncertainty as needed actions, that time is felt as compressed and problems seem to require immediate, nonreflective answers. Further, once the crisis begins, it can easily morph to other crisis types. Crisis management plans (CMPs) outline the steps to be taken from the vulnerability identification immediately after the crisis wire has been tripped. It requires both wide dissemination and practice. Both require considerable communication strategies, both of which are found in Johnson & Johnson's (J&J) Tylenol crisis and Morgan & Stanley's 9/11 crisis responses. In the former, J&J had the luxury of time between identification of the vulnerability (someone was tampering with Tylenol bottles) and response because the traditional media (radio and television networks and newspapers) gave it time to prepare a response (J&J was *not* ready for the crisis). In the latter, Morgan & Stanley had a CMP in place and had practiced it to ensure that employees and business structure loss would be minimized. What differed for Morgan & Stanley can be viewed as two things. First, it had already managed an earlier 1989 crisis that involved the bombing of the World Trade Center's basement. Second, the news frame was then reduced to immediate coverage through onsite video and few social media networks. In the decades since Morgan & Stanley, social media has moved from a reactive (e.g., get the word out) to a proactive

strategy (e.g., watch and monitor for misinformation across social media platforms and respond in real time).

In the forthcoming sections, we will delve further into what constitutes a crisis, risk, and the impact of social media on pandemic CMP communication strategies. Following this, a model will be derived that attempts to account for the morphing of the pandemic crisis to other crisis types and how social and cultural differences must be included in communication strategy. Finally, we will look at the ongoing COVID-19 crisis from a critical approach based on traditional crisis theory and the newer model.

Crisis Models and Planning

Our understanding of risk has demonstrated the importance of incorporating risk perception into the new crisis communication management models following pandemics. In this section, we aim to get a more in-depth understanding of a crisis and provide an overview of some existing models of crisis communication management. Given the vast amount of crisis communication and management literature, our discussion in this section is not exhaustive but serves as a baseline as we build toward a new model of pandemic crisis communication management.

Crisis Defined

What is a crisis? The term "crisis" is rather broad and encompasses numerous definitions by scholars and professionals. For example, Perry's (2007) general definition refers to crisis as system breakdowns that result in shared stress. Distinguishing crisis into disasters and organizational crisis, Coombs (2019, p. 2) draws on Quarantelli's (2005) definition of disasters and refers to it as "events that are sudden, seriously disrupt routines of systems, require new courses of action to cope with the disruption, and pose a danger to values and social goals"; organizational crisis, on the other hand, was defined as "perceived violation of salience stakeholder expectations that can create negative outcomes for stakeholder and/or the organization" (Coombs, 2019, p. 2). Similarly, Ulmer et al. (2015, p. 8) defined crisis, and specifically organizational crises, as "specific, unexpected, and nonroutine event or series of events that create high levels of uncertainty and simultaneously present an organization with both opportunities for and threats to its high-priority goals." It is also worth noting that disasters and organizational crises are not always separate; oftentimes, disasters can lead to organizational crises (Coombs, 2019).

Despite the various definitions, scholars and professionals alike have identified several important characteristics for crisis: suddenness, unpredictability, nonroutine, uncertainty, and threat (e.g., Coombs, 2019; Lerbinger, 2012; Ulmer et al., 2015). A crisis is an event that occurs as a surprise, is unplanned, or exceeds the most aggressive plans. Crises may be expected by warning signs but are most likely unpredictable (Coombs, 2019); they disrupt the routine and require unique and extreme measures (Ulmer et al., 2015). A crisis produces tremendous uncertainty beyond the routine and poses threats to health, safety, the environment, or economics, as well as the image and reputation of an organization (Coombs, 2019; Ulmer et al., 2015).

Types of Crisis

Not all crises are the same. Scholars have identified different types of crisis to aid the planning of crisis communication management. For instance, Coombs' (2019) classification of disasters and organizational crises, among the latter, also encompasses operational crises and "paracrises." Ulmer et al. (2015) differentiated unintentional crises (e.g., natural disasters and disease outbreak) from intentional crises (e.g., sabotage and unethical leadership). Although there are multiple crisis classifications, from a communication perspective, Lerbinger's (2012) classification system provides a straightforward approach to crisis types. As noted, Lerbinger defines crises as arising from three major elements: physical crises, human climate crises, and management crises. Physical crises include things that are found in nature (i.e., natural crises and biological crises) or which we have created through advanced technology (i.e., technological crises), of which we have little control over but can reasonably predict occurrences. Such crises include hurricanes, earthquakes, tsunamis, and naturally occurring illnesses such as viruses that become pandemic; technological crises arise when something created by man fails, such as aircraft crashes, chemical leaks, and mechanical failure. Human climate crises include confrontational crises between groups and malevolence acts (e.g., espionage, product tampering, and misinformation/deception communication campaigns). Finally, management failure crises arise from the mismanagement of social, psychological, and organizational life elements. Such crises arise through management failure through acts of deception and misconduct.

How Crises Morph

Crises seldom travel a straight path. In those cases where they do, the outcome is fairly easy to manage, but management requires preparation, beginning with environmental scanning for perceived threats or vulnerabilities. Based on such scanning, models can be created that provide the necessary but not particularly sufficient plans to intervene once the crisis has been declared. This includes identifying what will constitute the "tripwire" from which the crisis begins, the strategies for intervening the crisis in such a way as to mitigate damage and control outcomes efficiently and reduce damage. This includes creating a crisis management team with the expertise to mediate the crisis across vulnerabilities.

In many cases, crises will morph. The California wildfires in recent years were originally considered a natural disaster and physical crisis that damaged properties and residents' health, but when PG&E's mismanagement was revealed, it became an organizational crisis related to management and operation. In the case of COVID-19, the crisis has reached beyond the public health domain but also largely exacerbated racial inequality, disrupted the global economy, and accelerated international relations tension. Likewise, it was originally considered a physical crisis, but quickly morphed into crises at much larger scales. It later encompassed both human climate crises (e.g., international relations tension and travel bans) and management failure crises (e.g., unethical decisions made by companies regarding employees' health and inconsistent information). From a theoretical perspective, we can also draw from the Chaos Theory to better understand the non-linear perspective and morphing of crises. Chaos Theory, a framework originated from mathematical and physical sciences, casts light on crisis communication with the concepts of chaotic predictability, bifurcation, and self-organization (Seeger, 2002). COVID-19, in this case, has resulted in a rather

complex series of events as the physical crises/natural disaster interacts with numerous systems, human structures, and processes.

Existing Models of Crisis Communication Management

To create effective crisis communication management plans, scholars and professionals have proposed multiple frameworks and models. We next provide a brief review of some models for a baseline understanding of the current knowledge framework.

Anticipatory Model of Crisis Management

The Anticipatory Model of Crisis Management (Olaniran & Williams, 2001, 2008) focuses on precrisis events and emphasizes the key role of crisis prevention in crisis management (see Figure 10.1). It stresses the importance of understanding both the internal and external environments. The model looks at crisis-prone conditions such as organizational hierarchies due to their lack of control over various factors. It also argues for the establishment of control via vigilant crisis decision-making and planning.

The Instructing-Adjusting-Internalizing Crisis Communication Content Objectives

Sturges (1994) suggested that crisis communication should follow three main types of *information* as a crisis progresses—instructing information, adjusting information, and internalizing information. Instructing information tells people how to react to a crisis so stakeholders, target audiences, and publics know how they might be impacted by a crisis and what adequate actions they could take. These actions may include evacuation, seeking assistance, or returning defective products. In the case of COVID-19, instructing information may include proper physical distance and hygienic guidelines, as well as information on when and where to get tested. Adjusting information helps people cope with the crisis psychologically; it assures people with what is being done. Finally, internalizing information is used to help an organization repair its image and manage its reputation. It is worth noting that in times of organizational crises, instructing information is needed to protect those impacted before the reputational concerns are addressed (Coombs & Holladay, 2002; Sturges, 1994).

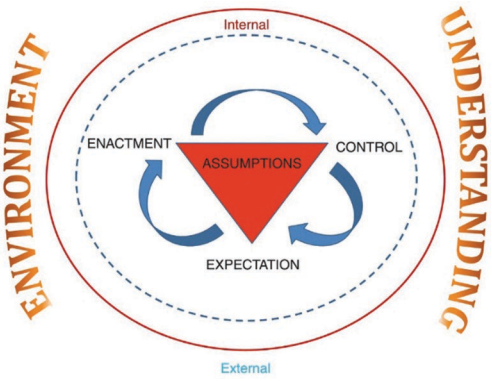

Figure 10.1 Anticipatory Model of Crisis Management (AMCM). *Source:* Olaniran and Scholl (2020). © 2020, John Wiley & Sons.

Reputation Management-based Crisis Communication Management Models

In public relations and communication management literature, many scholars have tapped into the *image restoration and reputation repair* perspectives of organizational crises, with Benoit's (1995, 1997) Image Restoration Theory (IRT) and Coombs' (1995) Situational Crisis Communication Theory (SCCT) being the two primary theoretical frameworks adopted (Avery et al., 2010). IRT stresses the essential role of organizational image and provides five broad categories of image repair strategies—denial, evasion of responsibility, reducing offensiveness of event, corrective action, and mortification (Benoit, 1995, 1997). These strategies are found in *post hoc* analyses of communications actually employed in crises and apply rhetorical analysis as case studies for detailed analysis. SCCT, on the other hand, is more geared to a social scientific approach and tends to use empirical examination. It is "premised on matching the crisis response to the level of crisis responsibility attributed to a crisis" (Coombs & Holladay, 2002, p. 166). Based on such premise, SCCT proposes that crisis response strategies should be selected based on different situations, including crisis type, organizational performance history, evidence, and seriousness of damage (Coombs, 1995; Coombs & Holladay, 2002).

The Social-mediated Crisis Communication Model (SMCC)

In light of the prevalent social media use by organizations and publics, Austin et al. (2012) proposed a social-mediated crisis communication model (SMCC). SMCC focuses on the importance of information form, source, and different types of information consumption before, during, and after crises. This model maps out the *direct and indirect relationships* between an organization and three different audiences on social media—influential social media creators who provide information; social media followers who consume the information directly on social media; and social media inactives who consume the information indirectly via word-of-mouth or traditional media. This model also notes the direct transmission of information between traditional and social media. SMCC has provided valuable insights for us to understand the interplay of source and form during crisis communication (e.g., Liu et al., 2016).

Call for the "End-to-end" Approach in Crisis Communication Management

In addition to the existing crisis communication management models we reviewed in the above sections, it is also important to note the importance of an "end-to-end" approach in managing crisis communication. The "end-to-end" approach, as proposed by Michaelson et al. (2019), focuses on establishing a robust measurement mechanism of objective-based public relations effectiveness. A crisis communication management plan is not complete without the measurement and evaluation of its outcomes. Nevertheless, not all plans would target or lead to the same outcome. So, what outcomes should we look at? The B.A.S.I.C. model (Michaelson & Stacks, 2011) provides the five essential components of a standardized communication measurement program given the *communication lifecycle* (see Figure 10.2). They are:

- **B**uild *awareness* of a brand, topic, or issue
- **A**dvance levels or degrees of *knowledge* on those items aware of
- **S**ustain *relevance* of messages on the specific subject or topic

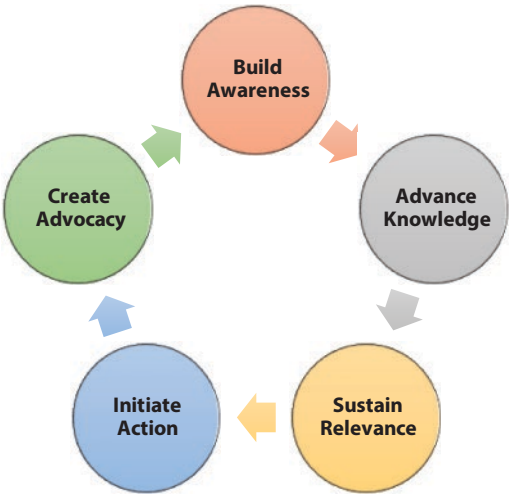

Figure 10.2 The B.A.S.I.C. model. *Source:* Based on Michaelson and Stacks (2011).

- **I**nitiate behavioral *intent* or *action* among a target audience due to exposure to messages
- **C**reate *advocacy* among the target audience in support of the messages.

The B.A.S.I.C. model can be applied to both non-crisis-related public relations/communication management programs and those related to crisis communication management. In the case of COVID-19, the communication message may come from different media and sources, and the publics' informational, attitudinal, and behavioral baselines may be at various communication lifecycle stages given the specific time, the morphing of crisis, and each public's own demographic and psychographic characteristics. Given the complexity and the morphing status of the crisis (and the related crises spawned on it), the B.A.S.I.C. model needs to be considered from a fluid, rather than a static perspective.

Risk Influences Crisis Morphing

Once a crisis has been declared, the focus is typically on the major class it arises in. Attention is almost always focused on the near and now, a concentrated focus on the specifics of the crisis type (e.g., physical, human, and management). Often, however, as the crisis originates, vulnerabilities, either undefined or those whose risk is now increased, are overlooked. A focus on risk typically entails a top-down approach, with factors identified as most risky addressed by themselves as the main effects of the crisis. Over time, however, as a crisis continues, risk dimensions and focus change, and the crisis may morph to encompass other crisis types. For instance, consider a major hurricane—one of Category 3 and above. The intensity of the crisis requires immediate reaction by the government; serious evacuation planning, resource management, and aftermath planning; teams that are prepared to move quickly and efficiently to affected areas; and considerable follow through. Compare the crisis planning of the

August 1, 2020, Hurricane Isaias in the southeastern United States to that of a week later in the northeastern United States; clearly, the risk to Florida, Georgia, and the Carolinas led to better aftermath planning than that of Connecticut, Rhode Island, and New York.

A public health risk typically involves a very large audience, and the individuals' perceptions of the risk vary greatly due to social and cultural characteristics, individual-level factors (e.g., varying health literacy and education levels, trust in the government or health organizations, knowledge about the risk, and perceived relevance), external factors (e.g., language barriers, access to healthcare, dependence on work, and the influence of media), organizational constraints, and more (Vaughan & Tinker, 2009). There is also a great amount of cognitive bias of how individuals perceive the risk. Therefore, in assessing and managing a public health risk, we take into full consideration the individual variations and perceptual biases and understand there is no one intervention/crisis management plan that fits all. Different communication messages/strategies address the multiple facets of a pandemic; this requires an acute understanding of risk perception and the challenges faced by risk communication.

Risk Perception

Unlike crisis events, a broader definition of risk deals with perceived impact, which varies greatly based on social, psychological, cultural, and health factors. Sandman (1987) defined risk as a combination of "hazard" and "outrage." *Hazard* referred to the scientific calculation of the risk event and its severity, such as the number of people infected and the mortality rate. Yet, perceptions of risk go beyond statistical information and largely depend on outrage factors, such as immediacy, uncertainty, familiarity, voluntariness, personal control, catastrophic potential, institutional trust, and media attention (Malecki et al., 2020).

van der Linden's (2015) risk perception model suggests that public perceptions of a risk event are shaped by the cognition (e.g., knowledge about the risk events), the experiential process (e.g., affect and experiences), the socio-cultural influences (e.g., cultures, values, and social influences), and socio-demographic differences (e.g., gender, education, and health literacy). This model was recently supported in a study of COVID-19 perceptions of 10 countries across Europe, America, and Asia. Dryhurst et al. (2020) found many significant predictors of risk perception, including personal experience, individualistic worldviews, social amplification of information through friends and family, individualistic and prosocial values, trust in government and health professionals, personal knowledge of government strategy, personal and collective efficacy, and gender; substantial variability of these factors was also found across cultures.

Besides the variations related to individual characteristics and social influences, risk perceptions may also skew due to social and psychological factors. For example, social psychological research has repeatedly documented *optimistic bias*: people falsely believe that their chance of exposure to negative events is lower than others (Weinstein, 1989). Optimistic bias has been found in smoking behaviors, unhealthy food consumption, and disaster planning (e.g., Arnett, 2000; Miles & Scaife, 2003). It is also more likely to occur for people living in individualistic societies such as the United States

(Fischer & Chalmers, 2008). In the case of COVID-19, risk perceptions may skew due to the optimistic bias, which result in risk-taking behaviors such as frequent outing for nonessential needs or failure to wear masks.

Another prominent framework related to risk perception is *social amplification of risk*, which states that risk events interact with social, psychological, institutional, and cultural perspectives and result in a heightened or attenuated public perception of the event (Kasperson et al., 1988). This amplification and attenuation process happens during the risk communication process and occurs in societal response mechanisms. Mass and social media act as major agents in the risk communication process. During the 2009 H1N1 flu outbreak in the United States, both governments and corporations relied on social media more than traditional media as their primary channels to disseminate information (Kim & Liu, 2012). Today, social media play a critical role in shaping perceptions of the risk, as discussed in a later section of this chapter.

Risk Communication Challenges

Several factors constrain the effectiveness of risk communication efforts. These constraints stem from controllable and uncontrollable factors involving both the organizations and the public.

Organizational Constraints

A pandemic is different from other crisis or risk events because it is ever-changing and develops and scales very quickly. Organizations may *not have adequate resources or information* to communicate the risk, especially during the early outbreak. In many cases, the nature of the virus is unknown at the early stages; therefore, scientists and health experts are not able to adequately plan and communicate the threat. For example, during the initial outbreak of COVID-19 in Wuhan, China, in December 2019, health officials did not have confirmative evidence to conclude that the virus could spread from person to person. By the time Dr. Zhong Nanshan confirmed person-to-person transmission in mid-January 2020, concerns and questions had arisen about why the information was not released sooner and the credibility of the Chinese government suffered.

During the early COVID-19 outbreak in the United States, health officials, including the WHO and the Centers for Disease Control and Prevention (CDC), advised against the use of facemasks, stating facemasks did not protect people. As US confirmed cases started to peak and more evidence emerged about virus transmission among people with mild or no symptoms, the CDC revised their recommendation, encouraging and even mandating wearing facemasks in public spaces. These contradicting messages created confusion and even resistance among the public.

Risk communication efforts are constrained when the *role played by the organization contradicts the public's expectations* (Lundgren & McMakin, 2018). When this role dichotomy happens, organizational credibility and risk communication effectiveness will suffer. For example, in July 2020, the Trump administration ordered US hospitals to bypass the CDC and send all COVID-19 patient cases to a central database managed by the Department of Health and Human Services (HHS). Traditionally, public health data are handled by CDC, and this change caused confusion among the health professionals and brought concerns that the data would be manipulated or withheld.

Successful risk communication requires support from key decision makers. However, risk communication may face *conflicting requirements from the organizations involved*. In a guideline released in early August 2020, CDC reversed its recommendation that people who came in close contact with COVID-19 patients need not get tested if they were asymptomatic. CDC previously encouraged anyone who had close contact with a COVID-19-infected person to get tested immediately. CDC Director Dr. Robert Redfield disclosed the changes were made based on "updated recommendations" from the White House coronavirus task force. Although the White House had constantly denied any attempt to slow down testing, the president repeatedly suggested that the United States should be doing less testing and blamed the high number of confirmed cases in the United States was due to excessive testing. HHS based this recommendation on "current evidence and best public health practices" (CNN, 2020). The conflicting considerations from the CDC and White House undermined trust in the overall risk communication.

Constraint from the Audience

Besides organizational factors, audiences also pose challenges to the risk communication efforts. Variations in individual cognitive and psychological states, apathy, mistrust of risk assessment, government and public institutions, hostility, panic, and denial all greatly affect how individuals interpret the health risk and their willingness and ability to accept public health guidelines (Lundgren & McMakin, 2018).

To defeat the pandemic requires societal solidarity, which may clash with individual values. The public may refuse to act because of personal values or lack of personal relevance. Some groups may be apathetic when the perceived risk is trivial and less concerning for themselves, despite the health threat their actions may pose to others. During the 2020 COVID-19 pandemic, apathetic responses were seen from younger groups such as college students. There were numerous instances where college students ignored public health guidelines and social distancing rules and partied in massive crowds.

The public may also develop a mistrust of risk assessment and form misperceptions of the risk magnitude (Lundgren & McMakin, 2018). Risk perception may get amplified or attenuated due to social, psychological, and cultural influences. On the extreme end, some people may get hostile, start to panic, and even deny the risk. When state shelter-in-place orders were first announced in spring 2020, many people panicked, emptying grocery store shelves. Some groups became hostile and angry because it disrupted their daily life and increased their distrust for the policymakers. Some were totally ignorant of the pandemic, quoting coronavirus conspiracy theories. As psychological research has shown (Douglas et al., 2017), while a denial strategy partly satisfies people's curiosity and helps them exert control in times of uncertainty and contradiction, it can be a coping strategy to reduce anxiety and fear, but it impairs cognitive ability, especially when information is scarce.

Risk communication outcomes depend on both organizational and individual factors, and this process interacts with social, political, cultural, and psychological influences. To develop a successful risk communication program, communication professionals and policymakers must develop a full understanding of audiences and craft multifaceted communication strategies that speak to each.

Role of Social Media During Pandemics

Research studies over a decade have demonstrated that the essential role of social media in crisis management (e.g., Coombs, 2011; Ki & Nekmat, 2014) with a large number of users and real-time use (Muralidharan et al., 2011). Today, more than 70% of adults in the United States use social media on a daily basis (Pew Research Center, 2019). Thus, by using social media, organizations can share crisis information with millions of people instantly and directly without gatekeepers (Muralidharan et al., 2011; Veil et al., 2011). Crisis communication becomes increasingly intertwined on-and off-line (Veil et al., 2011). In pandemic risk and crisis communication, social media are particularly important as the crisis is relevant to large and diverse audiences who constantly look for information (Liu et al., 2016; van der Meer & Jin, 2020; WHO, 2020b).

Early Monitoring

Research suggests that crisis communicators need to be *proactive* to assess the vulnerabilities and warning signs to minimize negative outcomes (Coombs, 2011, 2019; Lerbinger, 2012). This directly applies to pandemic risk and crisis management. Crisis types often morph from one to the other. A pandemic crisis and an organizational crisis often interrelate and overlap (Vos et al., 2017). For example, the travel industry had been struggling with their financial loss due to COVID-19. At the beginning of outbreak, many aspects of the virus were unknown, except that it was highly contagious and often fatal when intertwined with preexisting health conditions. People were advised to avoid close contact with each other; thus, most people stopped traveling. Consequently, according to United Nation's new Policy Brief in August 2020, the entire industry (e.g., airlines, cruises, hotels, theme parks, and travel agencies) encountered a financial crisis with the projection of approximately $1 trillion losses and 100 million jobs at risk in 2020 (Durkee, 2020). Some news experts were warning of a great recession.

During the era of COVID-19, societal tension also arises from the long-standing issues of racial injustice and police brutality in the United States. The killings of Ahmaud Arbery, Breonna Taylor, and George Floyd further escalated the tension. Video recordings of outrageous incidents were shared and went viral on social media, and nation-wide protests were held for the Black Lives Matter movement, calling for racial justice. The complexity of the situations led to the experience of multiple crises: pandemic, economic, and sociopolitical. It has thus become all the more important to listen to diverse internal and external publics to assess potential or elevating risks is critical on social media. In a complex crisis, social media can offer real-time conversations between organizations and their audiences to build trust and motivate actions (Tirkkonen & Luoma-aho, 2011). Thus, communication professionals should be proactive on social media because, as Lerbinger (2012) noted, preparedness, early detection, and prevention are the most important steps in pandemic crisis management.

Sources of Information

Social media platforms have become the center of information where organizations (e.g., traditional news media, corporations, governments, non-profits, and international organizations) and the public come together. Most social media users access

multiple platforms as their daily routines (Pew Research Center, 2019); thus, people end up gaining information from various sources through social media. The social media analytic platform Sprinklr reported that just under 20 million COVID-19 related mentions on social media were captured on March 11, 2020, alone (Molla, 2020). As such, the World Health Organization (WHO, 2020b) has identified a new term, *infodemic*, during COVID-19 to explain the *explosion* of information, "an over-abundance of information—some accurate and some not—that makes it hard for people to find trustworthy sources and reliable guidance when they need it" (Managing the 2019-nCoV "infodemic," paras. 2–3). Thus, timely and accurate information is all the more important to help navigate through the noise.

Social media can be a resourceful tool for people during pandemics. They have been a vital source for health crises because relevant information about the virus and behavioral guidelines are made accessible (Guidry et al., 2017). If people cannot get correct information in time, there is the danger of rumors and misinformation. In the case of COVID-19, CDC published important information about how the virus spreads and how to prevent it from spreading. They introduced several behavioral guidelines on being socially distanced and wearing masks. Such guidelines require consistent messaging across social media platforms to prevent confusion.

Some have used social media to disagree with CDC guidelines, and CDC repeatedly reversed its guideline during the outbreak. As a result, CDC's credibility was damaged and provided fodder for alternate guidelines, some dangerous if followed. There was increased confusion and distrust among people due to inconsistent messaging. This confused messaging (e.g., mask use) on social media promotes misinformation and supports those who would use the pandemic to their advantage.

Emotional/Psychological Needs

In a crisis, people often report negative emotions due to the crisis's uncertainty and potential destructive impact (Jin et al., 2010). Researchers found various types of negative emotions such as anger, fright, anxiety, and sadness during crises (Jin et al., 2010). In the COVID-19 pandemic, people and their families have been exposed to multiple personal vulnerabilities, such as economic insecurity, health uncertainty, social discriminations, and political issues. People also experience many restrictions to their daily routines including commuting, traveling, exercising, and even small gatherings with family and friends. Those restrictions only serve to increase negative psychological impact due to additional stress while dealing with looming health threats. Pew Research Center reported that nearly a third of Americans feel highly anxious and depressed since the COVID-19 outbreak (Ketter, 2020). Social media has been a space for people to virtually meet one another, share their stories, and vent their emotions; by doing so, they support each other emotionally. Wiederhold (2020) suggested following recommendations from the American Psychological Association to manage mental stress and create a feeling of normalcy by connecting with people virtually via social media. Kim and Liu (2012) suggested that organizations also consider sharing messages showing emotional and psychological support (e.g., sympathy or compassion for the victims). For communication professionals, understanding emotions is important as emotions have been shown to influence publics' behavioral intentions (Coombs, 2007).

Social Media Platforms

Social media platforms differ by user demographics and message format. YouTube, Facebook, and Instagram are the leading platforms across age groups in the United States. Thus, pandemic crisis communication research has utilized different platforms. For example, Facebook was studied during the 2009 H1N1 outbreak (Kim & Liu, 2012) and the Zika crisis communication (Sharma et al., 2017). Instagram and Twitter were studied in the 2014 Ebola outbreak in the United States (Guidry et al., 2017). Research found that health information with pictures produced more recall and attention (Houts et al., 2006). Recently, many social media platforms have started providing a function for sharing visuals (e.g., videos, infographics, and photos) because of their popularity among younger generations (e.g., TikTok). Guidry et al. (2017) found that Instagram, a visual-based platform, had more active engagement than Twitter during the 2014 Ebola outbreak, suggesting using more visuals with pandemic communication messages regardless of social media platform. Many social media users have accounts on multiple platforms because of different characteristics and because they can interact with different groups. Thus, to reach diverse audiences in pandemic risk and crisis management, messages with visual content should be used across multiple social media platforms.

Multiple Actors on Social Media

Many organizations are involved in pandemic crisis management. International and national health organizations such as the WHO, the CDC, the HHS, and the National Institute of Health (NIH) should be highly involved in risk communication because of their respective roles and responsibilities in the pandemics (Kim & Liu, 2012) to provide the most recent scientific findings and behavioral guidelines. In an *infodemic* era, people need correct information from credible organizations in a timely manner. Social media can be effective tools for elevating awareness of information during pandemics (Freberg et al., 2013) when it is used by government health organizations (e.g., CDC and HHS) and health experts. Abd-Alrazaq et al. (2020) suggested that having a strong presence of health professionals on social media may help prevent the spread of misleading information.

Kim and Liu (2012) reported that during the 2009 H1N1 flu outbreak, both US government and corporate organizations used social media more than traditional media to disseminate relevant information. Government organizations focused on providing *instructional* information (i.e., how to protect yourself from the virus), whereas corporate organizations emphasized *reputational* response (Kim & Liu, 2012). During COVID-19, most US state and local government officers have held press conferences to communicate instructional information across channels. Many companies communicated both instructional and reputational messages via social media platforms. For example, American Airlines communicated their commitment to safety but also announced new boarding guidelines for all customers that required wearing facemasks. As aforementioned, the response from the public varied depending on individual risk perceptions and beliefs about the virus. Some travelers posted complaints on social media, refusing to follow guidelines, and were thus asked to leave the airplane (Josephs, 2020). Increased complaints and backlash about organizational COVID-19 guidelines can be a potential risk to the company.

Challenges: Misinformation, Disinformation, and the "Echo Chamber Effect"

While social media can be effective channels for pandemic risk and crisis communication management, researchers have also warned of the potential repercussions leading to misinformation, disinformation, and the "echo chamber" effect.

Research has found that message truthfulness and source are not easy to identify on social media (Hellsten et al., 2019; Valentini & Kruckeberg, 2016). This suggests the danger of dissemination of fake news and false information on social media (Hellsten et al., 2019). For example, in the recent Zika virus pandemic in the United States, misguided video posts got more attention than accurate information on Facebook (Sharma et al., 2017). Since the COVID-19 outbreak, there has been an increase in social media misinformation that the virus was created in laboratories or vaccine companies (Frenkel et al., 2020). Abd-Alrazaq et al. (2020) also found that negative sentiment from stories on Twitter that increased racism and deaths were caused by COVID-19. Facebook and Twitter started warning about misleading posts about COVID-19 and later banned millions of posts that had the potential to harm people, including some from ex-president Trump (Wagner & Frier, 2020). Facebook noted 98 million potential disinformation posts about coronavirus and removed 7 million posts from Facebook and Instagram between April and June 2020 (Lerman, 2020).

Research has also found that health organizations, such as CDC, WHO, and MSF (a.k.a. Doctors without Borders), did not put enough effort to fight misinformation during the 2014 Ebola outbreak in the United States (Guidry et al., 2017). Guidry et al. (2017) suggested that communication professionals should actively communicate by providing accurate information to understand people's concerns and emotions and develop trust. Corrective information by government health organizations (e.g., CDC) and traditional news media can effectively "debunk" crisis misinformation during pandemics (van der Meer & Jin, 2020). Scholars suggest that government health organizations and communication professionals actively participate in the social media to prevent myths, fake news, or disinformation (Guidry et al., 2017; Hellsten et al., 2019; van der Meer & Jin, 2020). During the *infodemic* in COVID-19, the WHO has been managing and monitoring multiple social media platforms, including Facebook, Instagram, Twitter, Pinterest, LinkedIn, and Weibo to prevent the spread of rumors and misinformation (World Health Organization, 2020b).

An interesting aspect of social media is that users choose their own *network* on social media. They select social media accounts to include in their network, such as the websites of traditional news media, organizational media, influencers, friends, or family. This function lets users personalize their network; attracts social media users to the social media platform; and share their attitudes, beliefs, and values among those who share similar views. However, this personalization can limit users' views to those within their own networks. The "echo chamber effect" on social media helps to explain this phenomenon. Social media users tend to select like-minded people in their social media networks (Colleoni et al., 2014; Goldie et al., 2014). Thus, they are exposed to similar opinions that can potentially limit their views, leading them away from obtaining diverse perspectives. This is dangerous in pandemic crisis management because it influences risk perceptions, adds to already held biases, and adds misinformation from one-sided opinions that are not necessarily true.

Cross-sectoral Collaboration

COVID-19, as many other major issues, poses serious challenges to not only public health but also sustainable economic development and human rights, and eventually could threaten the future of human society. The unprecedented scale and scope of COVID-19 make it impossible for any sector, be that governments, corporations, or non-governmental or nonprofit organizations, to single-handedly provide adequate solutions (Yang & Ji, 2019). In this context, organizations are encouraged to form cross-sectoral alliances and advocate collaboration as a vital strategy to address complex sociopolitical issues.

According to Selsky and Parker (2005), cross-sectoral alliance refers to multilateral collaborations between organizations from multiple sectors. They jointly tackle a shared issue via problem-solving, information sharing, and resource allocation. Previous literature concluded that cross-sectoral alliances empower individuals and organizations to unite and maximize their strengths and capitals in the process of supporting each other (Lasker et al., 2001).

As a substantial portion of organizational communication takes place on digital platforms, cross-sectoral alliances communicate in addressing sociopolitical issues (Kent & Taylor, 2016). The interactive, communal, and relational features of social media present tremendous opportunities for organizations and individuals to express their opinions (Lee, 2017). Their communication initiatives online further increase public awareness and engagement with the advocated issue. Shumate and O'Connor (2010) argued that social media-based cross-sectoral communication is more than an extension of traditional communication. In this perspective, communication is strategic and selective regarding whom they recognize and communicate with as their strategic partners (Shumate & O'Connor, 2010).

A social network is a set of relationships among related social actors (Wasserman & Faust, 1994). Unlike other forms of communication, every post on Twitter, Facebook, and Instagram is linked to a "meso-level network map" (Marres & Rogers, 2000). Networks not only represent the basic structure of online communication but also contribute to the messages and content viewed by publics of interests. For example, when an organization communicates about COVID and tags ("@") someone in the same post, the organization invites that tagged individual or organization to join in the conversation. The same organization can also retweet, tweet at, or share someone else's post about COVID. By sharing the content, the organization also forms a link and a relationship with the content creator of the shared post. Each of the above-mentioned social media communication behavior carries different meanings. However, jointly, these practices also form networks of influence. Consequently, the publics' interpretation of a COVID-themed tweet or post is affected by both the content and on who is being referred to in this communication context.

These interactive and collaborative practices are common across multiple, if not all, social media platforms. For example, in the current context of COVID-19 communication, we find that when many organizations post about COVID-related issues on Facebook or Twitter, they routinely mention or embed links to strategic partners' accounts and content. When an organization mentions or tags another on social media, such messages communicate a symbolic partnership to the public and may create a perception of alliances. As such, communication about cross-sectoral alliances on highly visible organizational social media accounts not only allow organizations to interact and engage with strategic partners but also enable them to communicate such

alliances to millions of followers and interested publics (Jeong et al., 2013). In the networked digital space, the organizations and individuals that are referred to frequently by other users are prominent. They are the central *nodes* to the conversations of COVID. They may have the power to set public agenda and influence discourse and practice on policy formation, public behavior change, and more. In the social media age, a great number of conversations and information exchanges regarding COVID happen simultaneously online. These symbolic communication behaviors operationalized by meta-tagging, sharing, and mentioning can carry tangible results on resource mobilizations and the trajectory of social changes. Therefore, they need to be carefully and thoroughly examined and understood.

Given the importance of cross-sectional collaboration, professionals need to understand how each social media platform works and who the main users are and what message formats and contents are the most effective. Social media can add value to the crisis management during COVID-19, such as monitoring the public and issues, providing accurate timely information, preventing rumors and disinformation, and developing cross-sectional collaborations. Organizations and professionals should be proactive, engage in dialogue, and correct inaccurate information with the public.

Toward a New Model of Crisis Communication Management

Based on the above, the following model of crisis communication management is proposed. Note, however, that the preparation and planning for crisis as noted by Michaelson et al. (2018) should constitute the majority of crisis management planning. Based on an audit of a large international company's planning and preparation for crisis across five geographically and technically different commercial outcomes, they found that crisis communication management *preparation* yielded a pyramid-shaped effort (see Figure 10.3). As noted, advance preparation took up almost two-thirds of planning and preparedness time, time that might be re-examined in terms of risk-associated actions and/or products and basically functioning as early warning system creation or, as labeled in most crisis theories, environmental scanning programs.

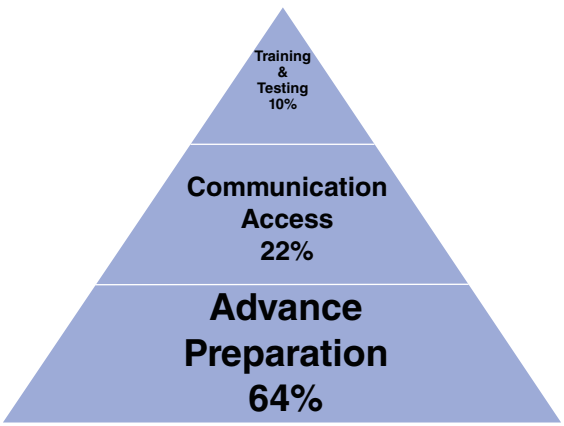

Figure 10.3 Crisis planning and preparedness pyramid. *Source:* Michaelson et al. (2018).
© 2018, IPRRC.

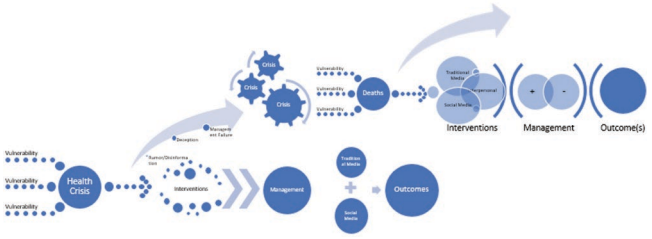

Figure 10.4 The crisis morphing model.

In the model (see Figure 10.4), this analysis is represented by the term "vulnerability." Each vulnerability is composed of crisis type(s) and degree of risk associated with it. The vulnerabilities would be listed in order of magnitude, that is, those that are most likely to meet tripwire specifications and set off a full-blown crisis management plan. The greater the number of vulnerabilities identified and ranked, the better manageable the crisis may become once it hits. In the case of COVID-19 in the United States, at least three elements of advanced planning of those vulnerabilities were removed (Trump's decisions to reduce Obama-era CDC planners; disengagement with the Chinese infectious disease program in the city of Wuhan, Hubei Province, China; and the disregard of the Obama-era infectious disease plan). Each of these instances could—and would—change the way the crisis might be best managed in the United States.

The COVID-19 Pandemic Crisis Case[1]

Much like many crises, the severe acute respiratory syndrome coronavirus 2—COVID-19—crisis begins in a certain crisis type. Just as the 2019–2020 California wildfire crisis can be seen as a force of nature–type crisis initially (e.g., fire was started in some manner—accidental, purposive, or natural, such as lightning strikes) coming from an extended drought period and then increasing by wind forces natural to the West Coast, the COVID-19 crisis began with the introduction of the virus through animal–human interaction. In the COVID-19 case, through buying and selling wild animals, with the virus spreading first among market stallholders and then to customers in Wuhan, China in December of 2019 and quickly spreading internationally. Of concern to this case, however, is the crisis management mistakes made by US public figures from its onset that morphed from similar naturally occurring pandemics, such as H1N1, SARS, and other animal to human transmission cases to a crisis of much broader scale.

Precrisis Vulnerabilities

Leading up to the COVID-19 pandemic crisis in the United States, the Trump Administration took several actions that severely impacted vulnerability analysis, as early as the 2017 briefings on infectious disease threats by the intelligence committee and the discussion about the Obama planning documents (Diamond & Toosi, 2020). In early 2018, the *Washington Post* reported that the CDC was to "cut by 80% efforts to prevent global disease outbreak" (Harris et al., 2020, February 02). By late spring 2018,

the head of Trump's disaster planning response, Admiral Ziemer, left the administration and was never replaced. However, Trump was briefed by intelligence officials on worldwide vulnerabilities in general and US vulnerabilities in particular (Coates, 2018, February 18). In September 2019, Trump ends participation in PREDICT, the early pandemic warning training program for scientists. This would impact the US response to the pandemic, as the program was located in Wuhan, China.

The Crisis[2]

In early January 2020, the CDC first issued the first alert of a public health problem in Wuhan, China, to the Trump Administration. The WHO issued a series of publications and social media reports concerning what appeared first to be a locally contained disease, but quickly determined (between January 4 and 28) that the outbreak was indeed an international event but not at the pandemic stage. On January 20, the first US case was reported in the state of Washington.

From this period on, internal Trump Administration officials urged the president to take the COVID-19 virus seriously but were met with passive responses such as Trump spinning a meeting with HHS Secretary Azar on the virus and Trump redirecting the meeting to vaping (Harris et al., 2020). Beginning in late January, Trump moves toward a series of Twitter messages first declaring that the virus is nothing more than the flu, then declaring that the CDC and his administration were doing a "great job" handling the coronavirus. It does not come out until later that the president was warned about the virus and its possible effects at the beginning.

Throughout the crisis, Trump used the social media, primarily Twitter, to put his opinions out regarding the virus's impact, how well he had done in warning the American people of the problem, acting quickly by stopping travel to and from China in January 2020, that he had ramped up the production of personal protection products (i.e., gowns and masks), and that a vaccine was imminent. These tweets were amplified by reporting in the traditional media, thus increasing false or misleading communications regarding how the crisis was actually being managed, if it was at all. As a result, Trump and many of his senior advisors and staff had tested positive for COVID-19, with the president hospitalized for three days in early October 2020.

Crisis and Risk Mismanaged through Social Media

Clearly, the communications regarding the COVID-19 pandemic in the United States has been driven through the president's social media use. From the very beginning, he has downplayed the risk associated with the virus. This has led many of his supporters to focus not on the virus but on various misleading approaches to the virus and its impact. As noted earlier, probably the most contentious campaign carried out by Trump and his supporters was the debate on required mask use to stop the virus. Indeed, his tweets upon leaving Walter Reed Hospital about the virus being nothing more than a case of the flu and his staged entrance to the White House Truman Balcony and the dramatic removal of his mask were picked up by both traditional and social media and then quickly spread through social media platforms. Reactions on traditional and social media only heightened the event's impact.

Because 2020 is a presidential election year, the intervention by fringe groups and other nations sowed dissent through misinformation regarding the crisis itself and the other crisis that morphed from it. Thus, both Facebook and Twitter were forced to self-impose review of posts and close down some groups and begin fact-checking posts. Misinformation and confusing releases of governmental regulations and suggested intervention strategies only increased perceived risk by some and downplayed that same risk by others.

Morphing of COVID-19 Crisis in the United States

Based on the handling of the US COVID-19 pandemic crisis, it is clear that what was a natural type crisis has morphed through several different crises. As noted earlier when discussing risk, social media, and crisis communication management, ex-president Trump's communicative messages and the question of what he knew, when he knew it, and what he then did about it provide the information necessary to identify crisis mismanagement that leads to morphing into distinctly different offshoots of the main crisis. What follow is a quick review of the morphing of a natural biological crisis.

Management Deception

From the beginning of the COVID-19 virus in the United States, the public has been deceived as to the impact and nature of the virus. Deception alters people's awareness of a problem and often is used to either question the knowledge being presented by the crisis manager or refute that information as irrelevant or false. From its beginning, the public was deceived as to the dangers associated with COVID-19, although some administration officials continued to stress the magnitude of the virus. This deception, although later justified by the president as not wanting to scare the public, clearly made crisis management interventions (social distancing, mask use, business closings, and so forth) hard to implement and enforce.

Management Mismanagement/Failure

Because of ex-president Trump's early administration cut back funding for the CDC and participation in PREDICT, it reduced its ability to scan the infectious disease environment. Through changes in how the CDC reported its data to the administration and the public, it failed to provide realistic descriptions of the virus and its impact on the public, especially when reported by demographics. Trump's continued messaging that the virus only impacts older people, and only those with preexisting conditions, changed the management focus away from children or youth, who when carrying the virus asymptomatically pass it on to more vulnerable parts of the population. Further, as noted by Michaelson et al. (2018), solid preparation is essential to effectively manage a crisis. By changing, dismissing, removing, or reducing those departments that serve to identify vulnerabilities and provide early warning systems, the ability to effectively manage the crisis through a communication plan is impeded.

Confrontation

The bipolarity of response to COVID-19 in the United States naturally led to potential confrontation between those who believe in the science and those who reject it. The mask debate moved from dialog to confrontation; people have been assaulted for asking others to wear masks. Civil unrest caused by this bipolarity further changed the

crisis orientation from health-related to human relations problems (e.g., Black Lives Matter). This has extended to the sociopolitical as the presidential election further divided the public along political lines.

Summary

This chapter sought to identify how crises change or morph over their lifetime. Focusing on vulnerability identification, risk management, and use of communication channels, it is possible to forecast what kinds of crises morph out of the main event. It then looked at active crisis, the COVID-19 pandemic as mismanaged through failure to identify vulnerabilities and risk and morphed into three different crises. Given the fact that the crisis was far from over by the time this chapter was written, we can only expect additional morphing.

Notes

1. As of the date of this chapter, the United States had the highest rate of infection and deaths worldwide: over 18 million infections and over 1 million deaths.
2. Given the day-by-day reporting of the COVID-19 pandemic in both traditional and social media, a timeline with specific dates of messages is beyond what can be reported in this chapter. The following are two sites that provide day-by-day timelines: Secon, H., Woodward, A., & Moser (2020, June 20). A comprehensive timeline of the coronavirus pandemic at 6 months, from China's first case to the present. *Business Insider*. https://www.businessinsider.com/coronavirus-pandemic-timeline-history-major-events-2020-3; Muccari, R., Chow, D., & Murphy, J. (2020, July 8). Coronavirus timeline: Tracking the critical moments of COVID-19. https://www.nbcnews.com/health/health-news/coronavirus-timeline-tracking-critical-moments-covid-19-n1154341.

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11

Perspective Change in a Time of Crisis

The Emotion and Critical Reflection Model

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The timing and location of the first reported cases of coronavirus disease 2019 (COVID-19) is unclear (Zeng et al., 2020). However, by the end of January 2020, the World Health Organization (2020) had declared the COVID-19 pandemic a global health emergency. Reports and speculation regarding the source, spread, symptoms, and treatment of COVID-19 blanketed traditional and social media in the subsequent months (Laato et al., 2020). Health professionals and researchers sought to inform and persuade the public about steps to slow the transmission of the disease. However, the highly saturated and at times contradictory COVID-19 media environment made communication of scientific and health information challenging (Calvillo et al., 2020; Laato et al., 2020).

Scholars in a range of fields expressed concerns about the effects of COVID-19 information overload and message fatigue, including mental health implications (Fiorillo & Gorwood, 2020) and the sharing and belief of misinformation (Islam et al., 2020). Past research suggests these concerns are warranted as overload and fatigue have been associated with negative outcomes such as diminished message elaboration and behavioral intention and increased reactance (Jensen et al., 2020; Kim & So, 2018; So et al., 2017). This presents a dilemma: during a pandemic, does the communication environment devolve into a growing population of exhausted, detached consumers, and, if so, then is there any communication strategy to break this cycle?

This chapter presents a rationale for producing messages that promote critical reflection through discrete emotion, focusing on surprise. Two message experiments conducted at different timepoints during the COVID-19 pandemic are presented. These experiments illustrate (i) message features that generate surprise, (ii) the surprise-critical reflection process, (iii) the outcomes of critical reflection, and (iv) the effect of information overload and perceived COVID-19 exaggeration on the hypothesized relationships.

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Critical Reflection

Critical reflection is a foundational concept of adult learning (Hoggan et al., 2017; Mezirow, 1991). The goal of critical reflection is to encourage individuals to interrogate their assumptions about society, knowledge, morals, and the self in order to foster learning and perspective transformation (Lundgren & Poell, 2016). The concept is particularly important for adult learning because adults have fully developed schemas for understanding the world and evaluating information. These schemas can hinder learning of information that does not fit these established understandings. Critical reflection can occur at varied levels of thought, about different topics, and be prompted by a variety of stimuli (Mezirow, 1998).

Despite its proliferation in the fields of education and psychology, among others, the concept has not received attention in messaging or persuasion research (Tikka & Oinas-Kukkonen, 2019). This may in part be due to the various, ambiguous, and at times contradictory conceptualizations and operationalizations of critical reflection (Van Beveren et al., 2018). Much of the scholarship on critical reflection is based on Mezirow's work (1991, 1998). Lundgren and Poell (2016) explained that "Mezirow's versatility when it comes to defining critical reflection and levels of reflection over the course of his fragmented high-level conceptual work has been often criticized by contemporary researchers" (p. 7). The complexity of Mezirow's system of classifying types of critical reflection, while providing nuance, makes operationalization challenging. Indeed, although critical reflection is considered essential to adult education, its operationalization varies greatly, making integration of findings across studies difficult (Lundgren & Poell, 2016).

Therefore, the emphasis here is not on critical reflection broadly but on that which will encourage information processing and behavior change during crises. Specifically, we draw from Mezirow's (1998) concepts of subjective critical reflection of assumptions and subjective critical self-reflection of assumptions and define critical reflection as the interrogation of one's assumptions and beliefs as well as the foundation or causes of those assumptions and beliefs. Critical reflection is transformative, meaning that it results in a change of beliefs, attitudes, or behaviors (Gardner et al., 2006; Jung, 2012). In a situation of crisis (e.g., the COVID-19 pandemic), critical reflection should promote learning of the available facts and information and criticism of misinformation and align audience behavior with professional recommendations.

Although related, critical reflection is distinct from message elaboration. Message elaboration is a concept that has received ample attention in persuasive messaging research (Briñol & Petty, 2012). Message elaboration indicates the extent to which audiences engage in issue-relevant thinking, with greater message elaboration leading to persuasion (Niederdeppe et al., 2012). Critical reflection goes beyond issue-relevant thinking to specifically interrogate the beliefs that drive one's interpretation of a message as well as interrogating the genesis of those beliefs (Mezirow, 1998). Critical reflection could be categorized as a type of message elaboration, but not all message elaboration qualifies as critical reflection. For example, after reading an article that detailed scientific support for mask wearing to limit the spread of COVID-19, a person could engage in message elaboration by considering the personal implications of this information, such as the likelihood of a government

mandate and the way this would affect daily life. This is not critical reflection. Critical reflection in this case might involve a person recognizing that they did not previously support mask wearing because of a political position, and then engage in critical reflection by considering why or how their political beliefs warrant their opposition to mask wearing.

Similarly, critical reflection is also distinct from counterarguing. Counterarguing involves generating opposing claims to those presented in a message and typically hinders persuasion (Dillard & Shen, 2005). Although the term critical is at times construed as meaning negative or opposing, this is not the case with critical reflection. Critical reflection does not mean producing arguments against a message, but rather reflection at this level is considered critical in that it "focus[es] on unearthing deeper assumptions or 'presuppositions'" (Fook, 2010, p. 40). Although the unearthing of these assumptions could hypothetically lead to opposing the message that prompted critical reflection, it is not expected to do so (Gardner et al., 2006).

Critical reflection may also support the epistemology of critical communication research and theory. Indeed, Craig (1999) stated that critical communication theory "explains how social injustice is perpetuated by ideological distortions and how justice can potentially be restored through communicative practices that enable critical reflection ... in order to unmask those distortions" (p. 147). Therefore, critical reflection is related to critical communication theory in that critical reflection is a tool for triggering the process of identifying assumptions that support injustice. Some traditions of critical reflection in education do emphasize uncovering assumptions that are specifically rooted in the dominant discourse and focus on issues of power (Brookfield, 2016; Fook, 2010). However, critical reflection does not require engaging with injustice or power (Mezirow, 1998).

Critical reflection should be an important goal of crisis messaging. Public responses to government mandates like business and school closures and mask requirements during the COVID-19 pandemic are evidence of how quickly individuals can become entrenched in particular ideologies and schemas for processing crisis-related information. In the United States, some expressed concerns that social distancing and mask mandates were an unprecedented violation of constitutional rights, leading to protests (Deliso, 2020). In order to influence these individuals, crisis messaging should stimulate critical reflection on the assumptions underlying beliefs about the mandates and their implications. For example, messages chronicling how similar mandates were made during the 1918–1919 influenza pandemic could prompt critical reflection.

In a crisis media environment, messages must be designed to cut through message overload and contradictory messages in order to encourage and promote critical reflection. Therefore, the message must first capture the audience's attention (Maibach & Parrott, 1995). But beyond capturing attention in general, the message must also direct the audience's attention to the assumptions that underlie their current stance about the message topic and encourage them to deeply consider the reason for those beliefs (Lundgren & Poell, 2016). Certain discrete emotions focus attention on important message components, making some more salient than others (Mackenzie, 2002; Nabi, 1999). In particular, surprise functions to direct the audience's attention to particular message features (Dillard & Peck, 2001).

Surprise

Surprise is a challenging construct to define. In a review of research on surprise, Loewenstein (2019) initially defined surprise as, "When we experience something startling or incongruous, often a low probability, salient event that is inconsistent with our expectations or requires explanation" (p. 179). While consistent with lay understanding of surprise, Loewenstein acknowledged that the definition lacked precision and lumped multiple features together such as probability, expectation, and desire for explanation. Given that, researchers often dissect surprise into precise components. For example, researchers examine how people respond to rare events (Itti & Baldi, 2009; Macedo & Cardoso, 2019), expectation violations (Foster & Keane, 2015), or the need for further explanation (Schützwohl, 1998), and label this as research on surprise. Loewenstein argued that both approaches are useful as lumping captures the fuzziness of the construct as understood by lay audiences and dissection maintains tight definitional control.

Researchers typically conceptualize surprise as a non-valenced discrete emotion, arguing that its valence is dependent on the context (Shen & Bigsby, 2010). The lack of valence has led some to question whether surprise is a discrete emotion (Dillard & Peck, 2001) while others view it as an amplifying emotion that magnifies the valence of the situation (Mellers et al., 1999). If surprise is a discrete emotion, then it may be the only one to lack valence (Loewenstein, 2019). This is consistent with research in cognitive science which has proposed that surprise originates from error processing in the anterior cingulate cortex and medial prefrontal cortex—two systems which are thought to be valence neutral (Alexander & Brown, 2019).

Message features or forms that elicit surprise are definition-dependent. Working from the lumped definition, surprise is elicited by messages or situations that are novel and/or unexpected and that trigger a need to explain (Loewenstein, 2019). Novel content and formats can elicit surprise as they represent the unknown (Dillard & Nabi, 2006) but surprise can also be generated by content that simply runs counter to what we believe to be expected (Foster & Keane, 2015). Message forms that have been shown to generate surprise include hyperbole, metaphor, minimally counterintuitive entities, randomness deficiency (Maguire et al., 2019), and the repetition-break plot structure (Boyer & Ramble, 2001; Loewenstein & Heath, 2009; McQuarrie & Mick, 1996). The latter was first recognized by the philosopher Baruch de Spinoza (1910) and is a feature of many life situations, but it can easily be identified and understood in narrative form. In narratives, the repetition-break plot structure occurs when an event repeats within a story (e.g., two characters get into heated arguments multiple times) and then deviates at the third or later occurrence (e.g., the two characters are getting ready to argue again, and, instead, have a romantic embrace). Indeed, surprise-inducing features are abundant in narratives as the storytelling process is also a sensemaking process where audiences make sense of novel or non-routine events (Bietti et al., 2019).

Surprise has the potential to initiate critical reflection. Loewenstein (2019) articulated the relationship between surprise and reflection as follows:

> (I)f we are surprised, then the process of forming explanations to make sense of the surprising event can open us up to changing our beliefs and attitudes. For

> this reason, leading others to experience surprises could prompt those others to change their beliefs and attitudes. Surprise has the potential to be a tool for social influence.
>
> *(p. 179)*

Researchers have long argued that surprise can lead to learning (Louis, 1980; Munnich & Ranney, 2019) primarily because there are novel stimuli or expectation violations that require explanation (Foster & Keane, 2015; Loewenstein, 2019). Notice that a key characteristic of surprise is that it generates a need for explanation. Sometimes, this need is quickly resolved, and sometimes, it takes time to unfold. In both cases, the need for further or alternative explanation is grounded in the notion that existing explanation is, in some way, insufficient. The process of interrogating how existing beliefs might be limited, incorrect, or flawed is the essence of critical reflection.

Critical reflection is connected to emotion broadly, with emotion serving as both a cause and an outcome of critical reflection although these relationships have received limited empirical testing (Gardner et al., 2006; Mackenzie, 2002). Critical reflection is often initiated by novel stimuli and experiences, as is surprise. Cope (2003) discussed how unusual, non-routine events, or discontinuous learning, trigger critical reflection more so than routine forms of learning. Further, Lucas (2008) explicitly discussed the importance of surprise in learning to prompt critical reflection, referring to the experience as "being pulled up short," stating that it "involves discrepancies between one's expectations and one's perceptions of an experience" (p. 389). Emerging research in child development underscores the centrality of surprise to learning as even young children seem to leverage violations of core knowledge (Stahl & Feigenson, 2019) or explanation-seeking (Liquin & Lombrozo, 2020) for generative learning (Breitwieser & Brod, 2020; Sim & Xu, 2019). Building from these understandings of emotion and reflection, we propose that crisis messaging utilize a surprise-critical reflection process whereby surprise motivates critical reflection.

Surprise should lead to critical reflection for several reasons. Surprise should direct attention toward considering why the message content was surprising (Foster & Keane, 2019). Surprise indicates that some aspects of the message were counter to our expectations to a great enough extent to elicit an emotional response (Lucas, 2008). Surprise motivates individuals to assess why the message did not align with their expectations and to evaluate those expectations (Adler, 2008; Loewenstein, 2019). Underlying assumptions and beliefs related to the message are a likely cause of the unexpectedness of a message. For example, a 1918–1919 pandemic narrative that includes social distancing may be unexpected, and therefore surprising, to people who believe social distancing measures are new and freedom-threatening. Surprise could motivate these individuals to engage in critical reflection about the reason for their beliefs about social distancing. Therefore, surprise should direct attention to underlying beliefs and the reasons for these beliefs, motivating critical reflection.

Further, surprise has the potential to break through previously held biases (Loewenstein, 2019). Typically, people find and approve of information that supports their current beliefs and attitudes (Westerwick et al., 2017). Messaging that attempts to persuade audiences of an opposing viewpoint can be met with reactance, including anger at the message source and perceived freedom threat (Ratcliff, 2019). Surprise, on

the other hand, can direct attention to alternative ways of thinking without a perceived freedom threat, motivated by a desire to understand the reasons for surprise (Adler, 2008). This would cause critical reflection via consideration of alternative perspectives (Mackenzie, 2002). Surprise can therefore disrupt the typical processing of counter-attitudinal information, leading to critical reflection and persuasion.

Similarly, because surprise directs attention toward the unexpected features of a message and the reason for their unexpectedness, surprise should direct attention and cognitive effort away from counterarguing. Counterarguing is a type of reactance which involves generating arguments against the points in a message, inhibiting persuasion (Ratcliff, 2019). Other aspects of the message consumption experience have been found to diminish counterarguing. For example, transportation imagery theory (Green & Brock, 2000) explains how becoming absorbed into a narrative can result in a suspension of reality and parasocial relationships with characters, reducing counterarguing (Ratcliff & Sun, 2020). Surprise can similarly absorb audiences into the message, directing attention and effort away from counterarguing and other forms of reactance.

Emotion and Critical Reflection Model

Building from the literature detailed above, we propose an Emotion and Critical Reflection Model (ECRM). Messages that contain novel and/or unexpected features, including novel content or format, will generate surprise (Dillard & Peck, 2001). Surprise will motivate engagement in critical reflection (Loewenstein, 2019; Lucas, 2008). Finally, critical reflection should promote attitudes and behaviors in line with the message (Gardner et al., 2006).

Although the current chapter focuses on surprise, other emotions likely induce critical reflection (Gardner et al., 2006; Mackenzie, 2002). Discrete emotions that are categorized as approach emotions, meaning emotions that encourage engagement with and consideration of the message topic, have the potential to lead to critical reflection (Nabi, 1999). For example, message-relevant anger is meant to focus attention on important aspects of the message and is linked to message elaboration, a concept related to critical reflection (Nabi, 1999; Turner et al., 2020). Hope is also meant to direct audience attention in favor of the message and, like surprise, is associated with novelty (Chadwick, 2015). Therefore, although the current chapter tests the effects of surprise, we postulate that other approach emotions will lead to critical reflection as well (see Figure 11.1).

The following studies report the results of two message experiments conducted at different time points during the COVID-19 pandemic. These studies test the surprise-critical reflection relationship, explicate message features that lead to critical reflection, and delineate the outcomes of critical reflection.

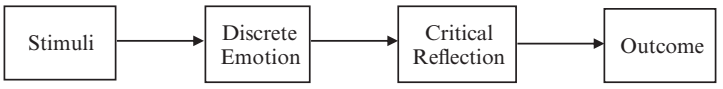

Figure 11.1 Emotion and Critical Reflection Model.
Note: In the studies presented in this chapter, stimuli include novel or unexpected messages and discrete emotion denotes surprise.

Study 1

Throughout the course of the COVID-19 pandemic, the public has received conflicting messages from a variety of sources, including health professionals, politicians, and other opinion leaders (Calvillo et al., 2020). As new scientific information emerged and priorities for containing the virus changed, agencies emphasized different safety precautions. During late May 2020, mainstream news reported that the Centers for Disease Control (CDC) had changed their position on the transmission of COVID-19 via surfaces (Farber, 2020). The CDC (2020) refuted these claims, demonstrating that their stance had been consistent. The changes in the CDC website had been made for clarity, not because of a change in position (CDC, 2020). Despite these refutations, the stories likely diminished the public's trust in the CDC, making people less likely to believe their claims about COVID-19 in the future.

The CDC's efforts to refute the accusations about flip-flopping on their position were made through didactic messaging. Yet, messaging research suggests that narratives are a more effective avenue for combating misinformation because they also address the affective response to the misinformation (Sangalang et al., 2019). Narratives should invoke greater emotion than didactic messaging, including surprise (Murphy et al., 2013). Additionally, narratives are expected to encourage critical reflection (Frost, 2006). Narratives immerse the audience in a perspective that is potentially different from their own, causing them to engage emotionally with that different perspective. Mackenzie (2002) suggested that, in order for critical reflection to occur, we must recognize other perspectives and try to see the world from them. Therefore, Study 1 tests if narrative, compared to didactic, correctives are more effective at producing surprise, leading to critical reflection and greater trust in the CDC.

Method

The data for this analysis is part of a larger, multi-week dataset: COVID Communication Weekly (CCW). Funded by the Immunology, Inflammation, and Infectious Disease Initiative, CCW surveyed 400 US adults each week from March 12, 2020 to November 18, 2020. Participants were stratified by sex (male or female) and education (50% with a high school education or less). CCW utilized a repeated, cross-sectional design—a new sample of participants completed the study each week. Administered by Qualtrics Panels, CCW had two basic components: (i) a core set of communication items measured all 36 weeks to examine shifts across time and (ii) a message experiment that changed each week.

Data for Study 1 derived from the rotating experiment included in week 12 of CCW (May 29, 2020–June 4, 2020). A total of 318 participants completed a two-condition (corrective: narrative or didactic) between-participants message experiment. Participants had an average age of 42.36 years (range from 18 to 79) and were primarily Caucasian (N = 258, 81.1%), with 11.3% identifying as Black or African American (N = 36), 14.2% as Latinx or Hispanic (N = 45), 6.3% as Asian or Pacific Islander (N = 20), 3.8% as American Indian or Alaska Native (N = 12), and 3.1% as other (unlisted) race/ethnicity (N = 10). Participants were evenly split between female (N = 161, 50.6%) and male (N = 157, 49.4%) and between those who had more than a

high school education ($N = 157$, 49.4%) and those who had high school education or less ($N = 161$, 50.6%).

After completing electronic consent and answering screener and demographic questions, participants were presented with a message claiming the CDC had changed their position on the transmission of COVID-19 via surfaces. Participants answered two open-ended questions about the message and then were randomized into one of the two study conditions: a didactic or a narrative corrective. The didactic corrective demonstrates that the CDC's position had not changed by showing an archived version of the CDC website as well as quoting the arguments from CDC spokesperson Benjamin Haynes. The narrative corrective tells the story of Jamie, who was initially afraid of getting COVID-19 from packages and became frustrated when she believed the CDC had changed their position. Jamie receives a message from a friend, directing her to the corrective information. After reading the corrective, participants responded to a variety of measures, three of which are reported here.

CDC Trustworthiness. Perceived trustworthiness of the CDC was measured using 4 items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) taken from the trustworthiness subscale of McCroskey's source credibility scale (McCroskey & Teven, 1999). Participants indicated how much they disagreed/agreed that the CDC is "trustworthy," "honest," "ethical," and "phony," with the last item reverse-coded ($\alpha = .80$, $M = 3.50$, $SD = 0.84$).

Surprise. Surprise was measured using three items from Dillard and Shen (2007). Specifically, participants indicated how much from 1 (*none of this emotion*) to 7 (*a great deal of this emotion*) the message made them feel "surprised," "startled," and "astonished" ($\alpha = .88$, $M = 3.85$, $SD = 1.55$).

Critical Reflection. The critical reflection scale was based off Kember et al.'s (2008) critical reflection in learning scale. Participants indicated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) whether the message "made me think carefully about things I believed," "challenged ideas I had about the world," "encouraged me to reflect on my beliefs," and "helped me to think carefully about complicated ideas" ($\alpha = .91$, $M = 3.55$, $SD = 0.96$).

Analysis

To compare the effects of narrative and didactic correctives on perceived CDC trustworthiness through the proposed surprise-critical reflection pathway, a serial mediation analysis was conducted using PROCESS model 6 in SPSS 25. A dummy-coded corrective condition variable was created (1 = narrative corrective; 0 = didactic corrective). The corrective condition variable was entered as the X variable, surprise as the first mediator, critical reflection as the second mediator, and perceived CDC trustworthiness as the Y variable. To test the ordering of the two mediators, the model was also tested with critical reflection as the first mediator and surprise as the second.

Results

The serial mediation model was significant (effect = .02, Boot $SE = .01$, 95% Boot CI: .0020, .0422). The narrative corrective generated more surprise (coefficient = .38,

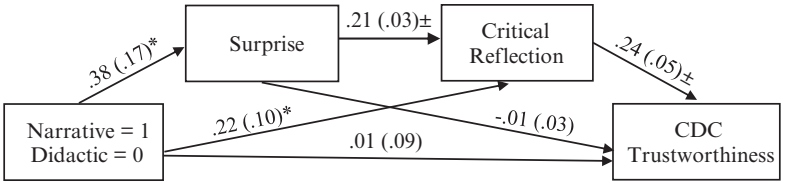

Figure 11.2 Study 1 serial mediation analysis. *$p \leq .05$, ± $p \leq .001$

SE = .17, $t = 2.23$, $p = .03$). When surprise was higher, participants engaged in more critical reflection (coefficient = .21, *SE* = .03, $t = 6.44$, $p \leq .001$). Critical reflection was positively related to perceived CDC trustworthiness (coefficient = .24, *SE* = .05, $t = 4.62$, $p \leq .001$) (see Figure 11.2).

To assess if the proposed ordering of the two mediators (surprise, then critical reflection) best fit the data, the model was also tested with critical reflection as the first mediator and surprise as the second mediator. This model was not significant (effect = -.002, Boot *SE* = .01, 95% Boot *CI*: -.0188, .0099).

Discussion

Study 1 demonstrates several key points. First, it supports the connection between surprise and critical reflection. Participants who reported more surprise were more likely to engage in critical reflection. Second, it demonstrates that critical reflection can impact outcomes in the direction desired. Greater critical reflection resulted in higher perceptions of the CDC's trustworthiness. Third, it suggests that narrative messages may be more effective at initiating the surprise-critical reflection process. This aligns with Murphy et al.'s (2013) finding that narratives have a greater impact on attitudes and intentions compared to didactic messaging in part because they produce a greater emotional response.

Study 1 also highlights important points related to crisis communication, particularly during the COVID-19 pandemic. In an environment in which the science being communicated is highly uncertain and ongoing, audiences may perceive scientific and governmental bodies as supporting contradictory stances, producing anger and frustration. Utilizing narratives to correct misinformation could address not only the factual issues but also the affective components (e.g., anger, frustration) that the misinformation initially engendered (Sangalang et al., 2019).

Study 2

As the COVID-19 pandemic continued into the late spring, news coverage began to include references to the 1918–1919 influenza pandemic. Stories featured in the New York Times, the Washington Post, and ABC News, among others, discussed mask wearing, social distancing, economic impacts, and outdoor schooling during the 1918–1919 influenza pandemic (e.g., Usero, 2020). The purpose of these stories varied from providing hope and historical perspective to persuasion. Results from Study 1 suggested that narratives may be more effective than didactic messaging at inducing surprise, leading to critical reflection. Study 2 builds on this finding by assessing the effect of a specific narrative type, historical narratives.

Health communication professionals and researchers expressed concerns over potential COVID-19 information overload (Fiorillo & Gorwood, 2020). Additionally, some of the public believed that messaging about COVID-19 was exaggerated (Calvillo et al., 2020). A goal of the surprise-critical reflection process is to engender perspective transformation in spite of an overload environment and skeptical audience. Therefore, we also test if COVID-19 information overload and perceived COVID-19 exaggeration serve as moderators.

Method

Data for Study 2 was derived from the core measures and rotating experiment included in week 14 of CCW (June 12–17, 2020). A total of 417 participants completed a 3 (year reveal: beginning, end, or none) × 2 (story: Jack or Nellie) between-participants message experiment. Participants had an average age of 46.53 years (range from 18–87) and were primarily Caucasian ($N = 342$, 82%), with 12% identifying as Black or African American ($N = 50$), 8.4% as Latinx or Hispanic ($N = 35$), 3.6% as Asian or Pacific Islander ($N = 15$), 0.2% as American Indian or Alaska Native ($N = 1$), and 3.8% as other (unlisted) race/ethnicity ($N = 16$). Participants were evenly split between female ($N = 213$, 51.1%) and male ($N = 204$, 48.9%) and between those who had more than a high school education ($N = 209$, 50.1%) and those who had high school education or less ($N = 208$, 49.9%).

After completing electronic consent and answering screener questions, participants responded to demographics and items about COVID-19 information overload and exaggeration. Participants were then randomized into one of the six study conditions. Participants read a story about either Jack or Nellie, both of which were adapted from actual 1918–1919 pandemic stories published by the Centers for Disease Control (2014). Participants read one of three versions of the story: (i) the year, 1918, was revealed at the beginning of the story, (ii) the year was revealed at the end of the story, or (iii) the year was not revealed until after completion of survey measures. After reading the story, participants responded to a variety of measures, five of which are reported here.

Social Distancing Intentions. An index of social distancing behaviors was created to capture intentions to engage in a variety of social distancing behaviors during the COVID-19 pandemic. Participants responded to 10 items on a scale from 1 (*extremely unlikely*) to 7 (*extremely likely*), indicating how likely they were to perform the behaviors to slow the spread of coronavirus. Items included: "engage in social distancing," "work from home," "avoid large gatherings," "cancel social activities," "wash hands at least 20 seconds," "use hand sanitizer," "avoid touching your eyes, nose, and mouth," "put distance between yourself and other people," "wear a mask in public," and "routinely clean all surfaces" ($\alpha = .91$, $M = 5.86$, $SD = 1.21$).

Surprise For measure description, see Study 1 ($\alpha = .90$, $M = 3.64$, $SD = 1.69$).

Critical Reflection. For measure description, see Study 1 ($\alpha = .91$, $M = 3.28$, $SD = 1.10$).

COVID-19 Information Overload. The core communication measures section of CCW included items assessing COVID-19 information overload and exaggeration. To measure COVID-19 information overload, participants responded to three items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Items were based on the cancer

information overload scale developed by Jensen et al. (2014). Participants were asked how much they agreed that, when it comes to coronavirus, "I am overwhelmed by the amount of messages," "I feel overloaded by the amount of information," and "I think there are too many messages" ($\alpha = .91$, $M = 3.23$, $SD = 1.19$).

Perceived COVID-19 Exaggeration. To measure perceived COVID-19 exaggeration, participants responded to three items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Items were based on a fabricating and exaggerating health conditions scale from Thompson et al. (2018). Participants were asked how much they agreed that when it comes to coronavirus, "I feel like the messages exaggerate how bad it is," "I think messages inflate the problem," and "I am skeptical that messages are telling me the truth" ($\alpha = .92$, $M = 2.88$, $SD = 1.32$).

Analysis

To test if 1918–1919 narratives impacted social distancing intentions through the proposed surprise-critical reflection pathway, a serial mediation analysis was conducted using PROCESS model 6 in SPSS 25. A dummy-coded study condition variable was created (1 = year revealed during narrative; 0 = year revealed after measures). Because the timing of the year reveal (beginning or ending) was not significantly related to any study variables, the conditions in which participants received the year reveal at the beginning or the end of the narrative were collapsed together. The study condition variable was entered as the X variable, surprise as the first mediator, critical reflection as the second mediator, and social distancing intentions as the Y variable. A dummy-coded story variable (0 = Nellie, 1 = Jack) was entered as a covariate. Moderated serial mediation analyses were conducted using PROCESS model 92 in SPSS 25 to test if the model varied based on COVID-19 information overload and perceived COVID-19 exaggeration. Separate analyses were conducted for the two possible moderators.

Results

The serial mediation model was significant (effect = .07, Boot $SE = .03$, 95% Boot CI: .0270, .1264). The revealed 1918 narratives generated more surprise (coefficient = .67, $SE = .17$, $t = 3.87$, $p \leq .001$). When surprise was higher, participants engaged in more critical reflection (coefficient = .31, $SE = .03$, $t = 10.57$, $p \leq .001$). Critical reflection was positively related to social distancing intentions (coefficient = .33, $SE = .06$, $t = 5.64$, $p \leq .001$) (see Figure 11.3).

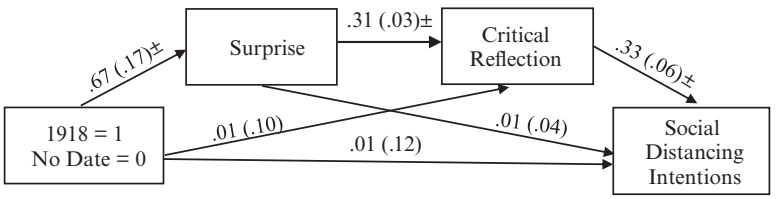

Figure 11.3 Study 2 serial mediation analysis. *$p \leq .05$, ± $p \leq .001$

The indirect effect of the study condition on social distancing intentions was moderated by COVID-19 information overload. Following Hayes (2017) recommendation, the effect was examined at the 16th, 50th, and 84th percentile. For those low in COVID-19 information overload, the study condition did not indirectly affect social distancing intentions (effect = .03, Boot *SE* = .02, 95% Boot *CI*: -.0084, .0732). The study condition did indirectly affect social distancing intentions for those at a moderate (effect = .08, Boot *SE* = .03, 95% Boot *CI*: .0309, .1425) and a high (effect = .16, Boot *SE* = .07, 95% Boot *CI*: .0495, .3267) level of COVID-19 information overload.

Similarly, the indirect effect of the study condition on social distancing intentions was moderated by perceived COVID-19 exaggeration. For those low in perceived COVID-19 exaggeration, the study condition did not indirectly affect social distancing intentions (effect = .01, Boot *SE* = .01, 95% Boot *CI*: -.0122, .0436). The study condition did indirectly affect social distancing intentions for those at a moderate (effect = .08, Boot *SE* = .03, 95% Boot *CI*: .0350, .1405) and a high (effect = .20, Boot *SE* = .09, 95% Boot *CI*: .0534, .4022) level of perceived COVID-19 exaggeration.

To assess if the proposed ordering of the two mediators (surprise, then critical reflection) best fit the data, the serial mediation model was also tested with critical reflection as the first mediator and surprise as the second mediator. This model was not significant (effect = .002, Boot *SE* = .01, 95% Boot *CI*: -.0123, .0185).

Discussion

Study 2 further confirms the connection between surprise and critical reflection. Findings enhance understanding of critical reflection beyond Study 1 in three important directions. First, critical reflection is associated with behavioral intentions, not just attitudes. Critical reflection about the narrative message was associated with intentions to engage in social distancing. Second, drawing from narratives of similar crises in history may be an effective way to engage audiences during a crisis and persuade them to take recommended actions. Third, findings suggest that utilizing the surprise-critical reflection process is most effective for individuals who are experiencing information overload or believe messaging related to the crisis is exaggerated.

General Discussion

The above literature and research findings support the ECRM. Specifically, messages that are emotion-inducing (such as narratives) and novel or unexpected (such as lesser known historical narratives) will prompt critical reflection via surprise (Dillard & Nabi, 2006; Lucas, 2008). Critical reflection involves the interrogation of one's beliefs and assumptions as well as the foundations of those beliefs (Mezirow, 1998). This critical reflection leads to attitude and behavior change in line with the message (Gardner et al., 2006).

The surprise-critical reflection process is effective in highly saturated message environments, such as the COVID-19 pandemic, in which an overwhelming amount of media coverage is focused on the topic. For individuals who are experiencing

information overload or feel skeptical about the import of the information, designing messages to elicit surprise may be an effective strategy. Surprise-inducing messages should cut through message overload and perceived contradictions in order to encourage and promote critical reflection.

The cognitive-evolutionary model of surprise posits that the amount of discrepancy between existing and new schemas determines the intensity of surprise (Reisenzein et al., 2019). This postulate raises the possibility that more intense surprise reactions could lead to more intense critical reflection. But it is also possible that surprise intensity could, at some point, negatively impact audience response perhaps by triggering feelings of unpleasantness. Researchers should be mindful that other discrete emotions and reactions are likely triggered with surprise (Dillard & Peck, 2001).

In addition to supporting the ECRM, the studies reported here further understanding of COVID-19 pandemic messaging. Study 1 tested the relative effects of narrative and didactic messages for addressing an actual communication problem faced by the CDC (2020) during the COVID-19 pandemic. Findings from study 1 indicate that the CDC may have been better served by utilizing narrative messaging in addition to their didactic messaging. However, narrative messaging may seem like an unusual strategy for a government organization like the CDC to use in this situation, creating a barrier to employing this strategy. Study 2 tested the effects of historical narratives as the popular media began to include references and entire stories focused on the 1918–1919 influenza pandemic. Findings from study 2 suggest that these stories may have moved audiences to engage in social distancing behaviors by eliciting surprise, leading to critical reflection.

Future Directions and Limitations

The findings presented in this chapter support the ECRM. However, these studies have several limitations, which point to important areas for future research. The following details these limitations and recommends several areas of future research, including (i) timing of measurement, (ii) message features, (iii) discrete emotions, and (iv) context.

Timing of Measurement. Both studies in this chapter measured surprise and critical reflection immediately following exposure to the stimuli. Future research should track critical reflection at later points in time. First, critical reflection is a potentially deep cognitive process that may unfold over days, weeks, or even years. Second, surprise increases the memorability of messages or situations (Foster & Keane, 2019) and this increases the likelihood that stimuli remain salient for critical reflection across longer periods of time. Third, surprise increases the likelihood that information will be shared with others (Eriksson & Coultas, 2014; Heath et al., 2001), and information with surprising elements has higher information-fidelity (Norenzayan & Atran, 2004). Sharing is an activity that spreads information to others, but it also leads to continued exposure and reflection for the sharer.

Discrete Emotions. The studies presented in the current chapter test the link between surprise and critical reflection, but other discrete emotions should lead to

critical reflection. For example, hope is theorized to capture audience attention, focus thoughts on future rewards and benefits, and, like surprise, is associated with receiving novel information (Chadwick, 2015; Parrott et al., 2015). Additionally, surprise, as a non-valenced emotion, is expected to precede, and perhaps magnify, other, valenced emotions (Dillard & Peck, 2001; Mellers et al., 1999). Other approach emotions, such as anger, could mediate the surprise–critical reflection relationship (Nabi, 1999, 2015). Future research should test if other discrete emotions, such as anger, guilt, and hope, lead to critical reflection.

Message Features. The research presented in this chapter identified two message features, narrative form and historical content, that induce surprise. Further identification and testing of the message features that initiate the surprise-critical reflection process is needed. In persuasive messaging research, several key message components cut across message types, such as argument strength, topic relevance, and, when targeting behavior, efficacy (Nabi, 1999; Turner et al., 2020). These features may be beneficial starting points for exploring necessary message features. However, in order to produce surprise, messages must include novelty (Dillard & Nabi, 2006) or unexpected features (Loewenstein, 2019). This could mean novelty of information or an unexpected message form. Past research in other fields suggests several other features such as hyperbole, metaphor, and the repetition-break plot structure can also induce surprise (Loewenstein & Heath, 2009; Maguire et al., 2019).

Context. The COVID-19 pandemic represents a unique communication environment. Pandemic messages blanket traditional and social media, and most individuals can clearly identify the importance and impact of the pandemic on their lives (Laato et al., 2020). Primary obstacles for scientific communication during a pandemic are misinformation and overload (Calvillo et al., 2020; Islam et al., 2020), and the ECRM seems well-suited to address these obstacles. It will be important to assess if the ECRM is equally beneficial and unfolds in the same way in other contexts. Of particular use will be contexts that do not have the same immediacy as a pandemic but are still characterized by high threat and importance, such as cancer or climate change messaging. In these contexts, a key obstacle for scientific communication is message fatigue.

Exposure to repetitive health messaging over time, such as messaging related to obesity, safe sex, or cancer, can create message fatigue (So et al., 2017). Message fatigue can result in diminished behavioral intention and policy support following a health message by increasing inattention and reactance (Dillard et al., 2018; Kim & So, 2018). The ECRM could counter message fatigue by prompting individuals to consider the topic in a new way. Surprise may be a particularly useful emotion to invoke when audiences perceive the messaging on a topic to be too similar and repetitive. Surprise-inducing messaging can recapture audience attention and motivate critical reflection.

Conclusion

This chapter proposes an ECRM leading to attitude and behavior change during times of crisis. Two research studies evidence the relationship between surprise and critical reflection and the effect of critical reflection on attitudes (e.g., trust in the CDC) and behavioral intention (e.g., social distancing intentions). Two message features induced surprise, including narrative (compared to didactic) messaging and historical

information. Two moderators, namely information overload and perceived exaggeration, were identified.

The chapter advances knowledge and understanding of COVID-19 pandemic messaging, as well as informs scientific communication more broadly. Study 1 assessed the effectiveness of the CDC's messaging strategy for correcting misinformation about their COVID-19 guidelines, compared to a more novel, narrative messaging strategy. The narrative corrective induced more surprise than the didactic corrective, leading to critical reflection and ultimately greater trust in the CDC. This suggests that government and health organizations should consider using novel messaging strategies to prompt reflection and information acceptance during times of crisis. Based on the current data, that could involve a narrative information campaign or a communicator contextualizing information via personal narrative. Level of trust in the CDC likely impacts whether the public will follow their health behavior recommendations, making the effective correction of misinformation about the CDC vital to public health.

Study 2 assessed the impact of historical narratives, which were commonly discussed in the media during the COVID-19 pandemic. Stories identified as being about the 1918–1919 influenza pandemic indirectly increased social distancing intentions through surprise-critical reflection. This suggests that the media's focus on historical pandemic stories likely benefited public health. In future crises, government and health organizations should draw from similar situations in history to provide perspective, normalize the crisis response, and reassure the public that similar crises have been successfully navigated in the past. Just as the 1918–1919 influenza pandemic provided helpful context during the current pandemic, future generations may leverage narratives from COVID-19 to increase adherence to preventive behaviors.

Future research should build on the arguments presented here to form a greater theoretical understanding of critical reflection related to communication. Other discrete emotions, such as anger, hope, and guilt, may lead to critical reflection, and the importance of specific emotions may vary with the context. In addition to information overload and perceived exaggeration, other moderators of the ECRM likely exist, such as political ideology and education. Continued testing and validation of the ECRM will advance the model and provide valuable insight to guide science communication strategy.

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12

Social Media Surveillance and (Dis)Misinformation in the COVID-19 Pandemic

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> *In* The Electronic Revolution*, I advance the theory that a virus IS a very small unit of word and image (p. 7). The only image a virus has is the image and sound track it can impose on you (p. 20).*
>
> Source: William S. Burroughs, *The Electronic Revolution*, Expanded Media Editions, 1970. © 1970, Expanded Media Editions.

> *Language. It's a virus!*
>
> Source: Anderson, L. *Language is a Virus*, Canal Street Communication, DBA Difficult Music, 1986. © 1986, Canal Street Communication, DBA Difficult Music.

Viruses are ancient organisms, and like all products of evolution, they strive to survive and thrive through reproduction in whatever ecosystem they are introduced. It is no accident that communication about an evolved virus, the coronavirus (SARS-CoV-2) variant COVID-19 that is responsible for the 2019–2020 pandemic, shares this reproductive quality. Posts made on Twitter, Facebook, Instagram, Reddit, 4chan, TikTok, etc., are sent out like seeds to propagate, and when they succeed rapidly and extensively, they are considered "viral." Indeed, the very concept of memes was born of an analogy between genetic reproduction at the cellular or chemical level and cultural reproduction at the communicative level (Dawkins, 1976; Spitzberg, 2014, in press; cf., Stano, 2020).

The world is a smaller place (Spitzberg, 2019) in which we are extensively interconnected in twenty-first-century "infomedia ecosystems ... marked by social media" (Depoux et al., 2020, p. 1). Our relationships, our lives, and our health are increasingly communicated through language (Jaidka et al., 2020; Kern et al., 2016; Merchant et al., 2019) and images (Gerlach, 2019; Introne et al., 2018; Li, Bailey et al., 2020; Seltzer et al., 2017). This revolution in media has pinned and penned our lives in publicly accessible ways as never before, including our health status. As such, "we are on the precipice of an unprecedented opportunity to track, predict, and prevent global disease burdens in the population using digital data" (Aiello et al., 2020, p. 101).

While the vast majority of social media posts, including fake news (Guess et al., 2019), do not reproduce (Rubin, 2019; Spitzberg, 2019), some posts such as bots and

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disinformation campaigns (Lukito et al., 2020) are engineered and artificially inseminated to reproduce at scale, producing the strategic communicative analog of a pandemic—or an *infodemic*. In this context, such distortions act as infopathogens, or information that is harmful and spreads or intensify as social epidemics (Magarey & Trexler, 2020). This chapter considers the virality of messages about the COVID-19 pandemic, with an interest in the ways in which systematic surveillance of such messages can serve important policy objectives, particularly in regard to managing the relative accuracy of public health information campaigns and the viability of the healthcare delivery response.

Our online behaviors and social media increasingly signal various aspects of health and disease in society (Aslam et al., 2014; Eichstaedt et al., 2015, 2018; Gibbons et al., 2019; Han et al., 2020; Issa et al., 2017; Jaidka et al., 2020; Kim et al., 2017; Lampos et al., 2020; Li et al., 2020; Merchant et al., 2019; Nagel et al., 2013; Rosenquist et al., 2011; Sharag-Eldin et al., 2019; Tulloch et al., 2019), and thereby, diagnose various potential demands on health systems (Guntuku et al., 2020). Further, the ability to extract health status through data mining of social media has demonstrated its feasibility (Yin et al., 2015). Given the extensive information contained in routine communications, a stratigraphic approach to social media becomes essential—there is the ordinary content of such messages, as intended by their authors or algorithmic designs, and the additional strata of what such message contents may reveal about other aspects of human activity. For example, people tweeting about their cold, sniffles, or cough may intend only to seek social support, comfort, or to let a friend or colleague know of a need to reschedule an appointment (intended communication), but mining such tweets may be repurposed by surveillance systems to signal changes in the chronogeometric dynamics of a disease outbreak (Spitzberg, 2019).

The very media that facilitate many aspects of public health policy and information, however, can also be employed in highly partisan (Vargo et al., 2017), incompetent, and malign ways, including through "misinformation, disinformation, rumors, and conspiracy theories," resulting in a communicative doppelganger of the viral pandemic—an *infodemic* (World Health Organization, 2020, p. 145). The nature of informational distortion has been neologized as dismisinformation, defined as "any message or set of messages that represent a meaning complex discrepant from or incompatible with a sender's intent and/or a relatively informed or expert consensual evidentiary state" (Spitzberg, this volume). There is little doubt as to the manifold potential of social media analytics to facilitate health communication (Capurro et al., 2014; Moorhead et al., 2013; Stoové & Pedrana, 2014; Velasco et al., 2014), but just as health information in social media provide health-promoting information, it can also distort, disinform, and deteriorate health-promoting behavior. Research shows that health-related misinformation promotes less health-protective behaviors and less compliance with institutionally promoted health protocols or regimens (Allington & Dhavan, 2020; Allington et al., 2020; Freeman et al., 2020; Imhoff & Lamberty, 2020; Jolley & Douglas, 2014).

To the extent that the utilization of online and social media can facilitate or deteriorate health practices and health interventions, a broad array of advancements in processing such digital data sources are needed to manage and control for noise, bias, bots, digital deceptions, disinformation, and misinformation, to name a few of the sources of potential error (e.g., Burkhardt, 2018; Vijaykumar et al., 2018). Furthermore, in the process of seeking surveillance functions of such media, in the process of

managing aspects of social media such as misinformation and disinformation, important insights may be gleaned into the design, focus, and implementation of public health campaigns.

There is ample evidence that substantial proportions of people are obtaining a significant portion of their news from online sources generally (National Foundation for Infectious Diseases, 2019) and social media specifically (Allcott & Gentzkow, 2017; Mitchell et al., 2020b) and that such news has a nontrivial impact on forming, reinforcing, or changing people's beliefs and actions (Mitchell et al., 2020a). Even though overall societal confidence in science itself in the United States has actually been increasing in recent years (Funk, 2020), there is widespread concern that social media amplification of fake news and conspiracy theory will increasingly undermine trust in, and actual functioning of, democratic institutions (Bennett & Livingston, 2018; Tucker et al., 2018). In the United States, over half of adults indicate their regular source of information about science topics is from general news outlets, but only 28% think these outlets "get the facts right about science almost always or more than half of the time" (Gottfried & Funk, 2017). A more recent Pew poll of over 6,000 US adults found that half (50%) of those surveyed believe "made-up news as a bigger problem than other key issues," such as violent crime, climate change, racism, illegal immigration, terrorism, and sexism, and just barely below the issues of the gap between rich and poor (51%), and problems with the US political system (52%). For example, health is one of the three main themes associated with fake news (Alzamora & Andrade, 2019). People mentioning "fake news" in their social media posts tend to voice opinions suspicious of mainstream media, and mainstream media tend to express suspicion regarding the dysfunctional disinformation diffused by social media (Al-Rawi, 2019). It becomes important, therefore, to assay the degree to which such information distortions have infected the body politic. Experts appear inclined to expect that public discourse will continue to stay the same, or become worse, as a result of "conspiracy entrepreneurs" (Sunstein & Vermeule, 2009, p. 212), and a 2016 survey of over 1,500 technology experts, scholars, government leaders, and corporate representatives in the United States found that twice as many (39%) expected online public discourse to be more as opposed to less (19%) "shaped by bad actors, harassment, trolls, and an overall tone of griping, distrust, and disgust" in the near future (Rainie et al., 2017, p. 4).

Surveillance of Stupidity: The Scope of Dismisinformation

In 2009, the Egyptian parliament passed a law to slaughter all 300,000 + pigs in Egypt "as a precaution against swine flu," despite the fact that no H1N1 flu cases had been reported and that all the medical expertise explicitly concluded that the infection was not transmitted from pigs to humans (Seef & Jeppsson, 2013, p. 3). The flu had been poorly and informally named in its inception. Although the slaughter was unique to Egypt, the belief that swine were a vector was not (Ahmed et al., 2019). The event "mirrored Egypt's battle with bird flu, in which the government killed 25 million birds within weeks in 2006" (p. 3). In the early 2000s, the science denialism of the Mbeki government in South Africa regarding HIV drug therapies led to the official promotion of herbal remedies and the refusal to use available therapeutics. This cost an estimated 343,000 lives (Nattrass, 2008). In late April 2020, in the midst of the COVID-19

pandemic, the health ministry for the largely Muslim country Iran announced that over 5,000 Iranians had been poisoned from methanol alcohol, resulting in 525 deaths since February, and at least 90 persons had gone blind or suffered ocular damage due to methanol poisoning (Al-Arshani, 2020), due most likely to a false rumor of the viral-disinfecting value of alcohol (Iranpour et al., 2020). Similar cases have been reported in the United States (Yip et al., 2020). By extraordinary confluence of events in that April, President Trump suggested at a White House press briefing on the pandemic that there might be potential medical value in ingesting or injecting some form of disinfectant (Farley & Kiely, 2020).

The broader problem of misinformation may begin with the problem of relative media illiteracy in the general media consumption marketplace. According to a Pew Research Center poll of over 5,000 US adults, only approximately a quarter (26%) were able to correctly distinguish five factual statements from opinion statements, and errors were biased by confirmation biases of political leanings (Mitchell et al., 2018). Research indicates that lay media consumers "routinely (and incorrectly) judge around 40% of legitimate news stories as false, and 20% of fabricated news stories as true" (Pennycook & Rand, 2019, p. 2521).

One perspective is that the openness and diversification of a presumably open Internet that false information is counterbalanced by corrective feedback opportunities. In essence, the wisdom of the crowd may offer an advantage in managing dismisinformation. Although modern media allow for rapid diffusion and amplification of fake news, research (Berduygina et al., 2019; Tucker et al., 2018) and case studies suggest that media fragmentation and immediacy also tend to provide processes of identification, cross-cutting ideological exposure, and self-correction of disinformation more so than in the past (Van Heekeren, 2020). Yet, the Internet and social media are not ambivalently neutral. Fake news and conspiracy theories often take the form of (mainstream-)mediated manufactured informational moral panic—a threat that may be real, but is used by actors in various ways so as to manage social constructions of boundary work, power relations, and expectations of acceptability (Carlson, 2020). Social media are increasingly used by state and nonstate actors in the service of increasingly authoritarian or political opinion manipulation (Bradshaw & Howard, 2018; Shahbaz & Funk, 2019). Some research suggests that false information takes longer to be corrected in social media than in other media platforms or sources (Zubiaga et al., 2016).

A key reason that social media and the Internet are used by such motivated actors is its efficiency at amplification. "The defining features of social media technologies (i.e., the ability to establish desired networks and to share or discuss information within one's chosen network) are the same features that make it possible for nefarious actors to exploit processes of collective sense making to spread misinformation" (Schefulele & Krause, 2019, p. 7665). Given the amplification and acceleration provided by social media platforms and networks, viral digital contagion can outpace actual viral contagion (Depoux et al., 2020), and indeed, given the reach, repeatability, and velocity of the media through which the virus spreads (Wilson & Chen, 2020), viral information has a distinct advantage over traditional media.

If the average media consumer is sometimes fooled by, or participates in, the development of fake news or conspiratorial narratives, it helps explain the extent of dismisinformation in the media noosphere. A representative survey of US adults

regarding the 2016 presidential election indicated that almost 10% reported sharing fake news stories (Guess et al., 2019). Based on a Pew survey of over 1,000 people, almost a quarter (23%) of the US adult population say they have shared a made-up news story, either knowingly or not, and about two-thirds (64%) "say fabricated news stories cause a great deal of confusion about the basic facts of current issues and events" (Barthel et al., 2016). An extensive analysis of key terms related to geo-engineering topics, such as stories regarding climate change, found that 60% of mentions involved conspiracy theories, 90% of which were accounted for by the Twitter platform (Tingley & Wagner, 2017).

General Disease-related Dismisinformation

Conspiracy theories and fake news populate a broad array of topics regarding health. A nationally representative survey of US adults found that almost half (49%) agreed "with at least one medical conspiracy theory" (Oliver & Wood, 2014). Not surprisingly, the more conspiracies respondents agreed with, the greater their proclivity to report using alternative medicines and the more they avoided traditional medicines (Galliford & Furnham, 2017). A study in Poland of 80 of the most frequently shared Facebook pages in which any of a variety of health keywords appeared demonstrated that "the topic most contaminated with fake news was vaccinations (90%), followed by hypertension and HIV/AIDS (both in 70%). Altogether, links containing fake news were shared 451,272 times between 2012 and 2017 and accounted for 40% of the studied material" (Waszak et al., 2018, p. 116).

Studies of previous disease outbreaks provide a similar picture. A study of 142 YouTube videos related to the H1N1 outbreak of 2009 found that 23% were misleading, with a viewership share of 17.5% (Pandey et al., 2010). Another study of 118 YouTube videos with information about Ebola during the 2014 outbreak estimated that 26% were misleading (Pathak et al., 2015). A further study of 100 YouTube videos relevant to yellow fever, which had been collectively viewed 934,108 times, found that approximately a third could be categorized as misleading (Ortiz-Martínez et al., 2017). A study of the top 200 Facebook posts during a week of the Zika outbreak in 2016 found that approximately 12% contained misleading or misguiding information (Sharma et al., 2017). An examination of tweets regarding the 2017 yellow fever outbreak found that 61% contained misleading content, which were more likely than the correct tweets to be retweeted, and most commonly prescribing ineffective or untested plant-based cures (Ortiz-Martínez & Jiménez-Arcia, 2017).

Specific CORONA-related Dismisinformation

Given contemporary evidence that disease outbreaks tend to elicit or fortify dismisinformation, it is no surprise that social media will have served as conduit of such information during the COVID-19 pandemic. To begin, the public seems to devote extensive attention to news about the pandemic. A survey by Pew Research Center found that approximately half of US adults conveyed they had been following such news closely, and another 38% indicated they followed such news fairly closely (Mitchell & Oliphant, 2020), although a later poll indicated that attention to the media had waned from a high of 57% "very closely" following COVID-19 news in late March to 39% in early

June (Mitchell et al., 2020b). A YouGov survey of US adults also found that 36% (very closely) and 44% (somewhat closely) followed the news about coronavirus.

Survey Studies

At the same time, the public seems to have felt fairly discerning about following such news. In the Pew survey, approximately half (48%) reported having been exposed to some degree of "made-up news and information about the virus." An online interview survey by YouGov of 1000 US adults between February 28 and March 2, 2020 indicates that over 90% had heard of the coronavirus, and a third said they were "very" or "somewhat" scared of contracting it. A survey in Nepal found rates of correct responses to a COVID-19-related knowledge quiz varied between 47.5% and 92.5% (Singh et al., 2020b). A survey by Pharmaceutical Technology of over 1,800 respondents found that over two-thirds believed the epidemic poses a threat, whether "significant" (22%), "serious" (24%), or "extremely serious" (35%) in nature (Nawrat, 2020). Substantial percentages of respondents indicated they have already begun taking actions, including avoiding contact with tourists (17%), limiting touch of objects in public (24%), avoiding crowded places (27%), and enhanced personal hygiene (e.g., washing hands frequently, 42%). Another 14% were considering canceling travel plans abroad, 13% were stockpiling preparation goods, 7% reported wearing a face mask, and 3% reported avoiding going into work or working from home. A YouGov survey (Frankovic, 2020) conducted between April 19 and 21, 2020 showed that still only 61% of respondents reported they had worn a face mask in public (up 8 points from the week before, 19 points from the week before that, and up from a meager 12% in late March). In this poll, 17% reported that "the cure is worse than the disease." Such misunderstandings are not peculiar to the US population. In sum, misinformation and misunderstanding about COVID-19 appear ubiquitous.

Given the nature of the emerging threat and a sizeable lack of trust in government sources of information, conspiracy theories are already spreading about COVID-19, including the belief that the virus is an engineered bioweapon (Jolley & Lamberty, 2020; Stix, 2020). A representative survey of 2,023 US adults in mid-March 2020 (Uscinski et al., 2020) found that approximately a third of the population believes the threat of COVID-19 is being intentionally exaggerated (29%) or that the virus was intentionally created and spread (31%). A quota sample of 2,501 adults in England found that of 48 conspiracy statements regarding COVID-19, substantial proportions showed some degree (25%), consistent (15%), or high levels (10%) of endorsement.

A survey of the general public in the United States and the United Kingdom found that approximately 18–24% believed that the virus was bioengineered by a government or terrorist organization (Geldsetzer, 2020). In this sample, approximately 61–72% believed that less than 500 people would die from the disease in 2020, suggesting a massive underestimation of the virus's fatality rate, and about 39–54% believed children were the age demographic most likely to die from contracting the virus. Further, when queried regarding preventive actions, 36–43% believed using a hand dryer, regularly rinsing one's nose with saline, taking antibiotics, or gargling with mouthwash would "help prevent catching an infection with the new coronavirus" (p. 2). Approximately a quarter (24.4–29%) believed that receiving a letter or package from China puts a person at risk of getting infected with the new coronavirus.

The American Trends survey by Pew Research Center also revealed such forms of misunderstanding. A survey of 8,914 US adults between March 10 and 16, 2020 found 29% believed the virus originated in a lab, such that 23% believed it was developed intentionally and 6% believed it was accidentally created (Schaeffer, 2020). Republicans were almost twice as likely to endorse the lab-generated belief than Democrats, and in general, somewhat more Republicans (53%) believed they had seen news that was "completely made up," compared to 42% of Democrats, a difference magnified among Republicans who were primarily getting their news from right-leaning media (Mitchell & Oliphant, 2020). Over a third of respondents believed the news media had been greatly exaggerating the risks associated with the virus. A Pew survey in June found that of the 71% of US adults who had heard "at least a little" about a conspiracy theory that "powerful people" intentionally planned the outbreak, 36% said they thought this was "definitely" or "probably" true, representing 25% of the US adult population (Mitchell et al., 2020b).

In contrast, substantial majorities across most countries believe that 5G mobile technology does not transmit COVID-19, that garlic does not prevent infection, and that children are not immune from the virus (Ipsos, 2020a). An Economist/YouGov survey of 1,500 US adults showed 44% (13% definitely true; 31% probably true) believed that the United States was concealing the true scale of its coronavirus deaths, 49% (14% definitely true, 35% probably true) believed the coronavirus was manmade, 13% (5% definitely true, 8% probably true) believed it was a hoax, and 44% (18% definitely true, 26% probably true) believed the threat was being exaggerated for political reasons (*The* Economist/YouGov, 2020).

Social Media, YouTube, and Internet Studies

Fake cures are spreading through social media, such as recommendations that flu medications, antibiotics, vitamin C, or anti-tapeworm medication mixed with carom seed and fennel in hot water can combat the virus (Nawrat, 2020). Ahmed et al. (2020) found that in a sample of 233 tweets about the 5G/COVID-19 link, a little over one-third "contained views that 5G and COVID-19 were linked," whereas almost a third "denounced the conspiracy theory." In all, almost two-thirds "of tweets derived from non-conspiracy theory supporters, which suggests that, although the topic attracted high volume, only a handful of users genuinely believed the conspiracy" (p. 1). Basch, Basch et al. (2020) and Basch, Hillyer et al. (2020) examined 100 most widely viewed YouTube videos related to the coronavirus and found that they frequently contained misinformation about COVID protective behaviors. Cuan-Baltazar et al. (2020) found that much of the content on websites on COVID-19 or SARS-CoV-2 contained misinformation. Kouzy et al. (2020) "conducted a search on Twitter using 14 different trending hashtags and keywords related to the COVID-19 epidemic" (p. 1). Their detailed analysis of 673 tweets found extensive amounts of misinformation. Gallotti et al. (2020) studied "100 million Twitter messages posted worldwide in 64 languages during the epidemic emergency due to SARS-CoV-2 and classified the reliability of news diffused." They concluded

> that waves of unreliable and low-quality information anticipate the epidemic ones, exposing entire countries to irrational social behavior and serious threats for public health. When the epidemics hit the same area, reliable information is quickly inoculated, like antibodies, and the system shifts focus toward certified informational sources.
>
> (*p. 1*)

Rovetta and Bhagavathula (2020) examined Google Trends in Italy and found that "most COVID-19-related information that circulated in the regions of Basilicata, Umbria, and Emilia Romagna were found to be superficial and did not provide clearer information on COVID-19. Misinformation was widespread in Umbria and Basilicata" (p. 5), and previous research in Italy was able to link vaccination misinformation explicitly to decreases in child vaccination rates (Carrieri et al., 2019), which has implications for the eventual rollout of a COVID-19 vaccination (see also, Fernandez et al., in press).

A selective examination of 100 "pieces of misinformation content in six different languages" about COVID-19 estimated that these messages were "shared over 1.7 million times on Facebook, and viewed an estimated 117 million times," 65% of which had been debunked by Facebook's own fact-checking review, much of which nevertheless remained without warning labels (AVAAZ, 2020, p. 2). A deep dive by Bruns et al. (2020) into Facebook messages about COVID-19 and the 5G conspiracy theory, from late January to mid-April 2020, indicated a core network of English-language content, which served as a connective tissue across dozens of other countries, cultures, and languages, which suggests the key vector of conspiracy theory contagion. They also point out that the 5G theory was "swiftly retrofitted" and grafted onto "long-standing conspiracist beliefs about the supposed health dangers of 5G, as well as about vaccines, global elites, China and other well-established targets of suspicion" (p. 15). Islam et al. (2020) conducted a content analysis across multiple media sources between December 31, 2019 and April 5, 2020, identifying 2,311 reports of rumors, stigma, and conspiracy theories related to COVID-19. In addition to an extensive list of such forms of misleading communication, their ratings indicated a substantial predominance of simply false information, with minor amounts either misleading or not proven.

Echo Chambers and Infobubbles

Dismisinformation is amplified by social reinforcement forces in echo chambers, information bubbles, and homophilous networks further facilitated by the nature of social media (Sunstein & Vermeule, 2009; Törnberg, 2018; Zollo, 2019). "Users tend to aggregate in communities of interest, which causes reinforcement and fosters confirmation bias, segregation, and polarization. This comes at the expense of the quality of the information and leads to proliferation of biased narratives fomented by unsubstantiated rumors, mistrust, and paranoia" (Del Vicario et al., 2016, p. 558). A 5-year study of Facebook misinformation and rumor spreading in Italy and United States reached three basic characterizations that emphasize the role of homophilous echo chambers: "users tend to a) join polarized communities sharing a common narrative (echo chambers), b) acquire information confirming their beliefs (confirmation bias), and c) ignore dissenting information" (Zollo & Quattrociocchi, 2017, p. 1). Such echo chambers amplify the spread of rumors (Choi et al., 2020).

In another study, for a given polarized scientific conspiracy user, the proportion of friends with the same polarization level was extremely high ($\gtrapprox 0.75$) and increased with the increased engagement of the users (Bessi et al., 2016). The study also found that "the bigger the spreading of the information, the larger the fraction of conspiracy users 'liking' it. ... Hence, users with a conspiracy-like polarization seem to be a more susceptible medium for the diffusion of false information" (p. 2056). In other words, "homophily and polarization are possibly the key metrics to target the communities where cascades

of false or misleading rumors (the atoms of misinformation) are more likely to spread" (p. 2057). A detailed study of news and social media information bubbles estimated that "85% of liberals are not being exposed to an ideological view (Fox News) that over two thirds of the most conservative quintile are being exposed to. And 78% of conservatives are not being exposed to an ideological viewpoint (MSNBC) that 78% of liberals are being exposed to" (Eady et al., 2019, p. 18). Social and even traditional media not only diffuse dismisinformation, but their own agenda-setting biases become reinforced in insular social networks and echo chambers. Furthermore, there is emerging evidence that echo chambers are increasing across most cultures (Alshaabi, Dewhurst et al., 2020).

If misinformation, disinformation, conspiracy theories, fake news, digital deceptions, and other forms of communicative distortion are widespread and pose a significant problem, the question arises of how such dismisinformation can be explained. This necessitates a consideration of theoretical approaches to explaining dismisinformation. Understanding the causes and patterns of dismisinformation is likely to be a requisite to its control and management.

Covidiocy and Credibility in Twitter

If a systematic approach to strategic management of dismisinformation is to occur, the phenomenon must possess some degree of characteristic structure to identify. Conspiracy theories may reveal significant linguistic markers that will allow them to be identified. This may reflect the hypothesis that conspiracist beliefs are monological, reflecting common underlying cognitive traits. In one study of Italian conspiracy theory posts, "the more a user is engaged in conspiracy storytelling the more her probability to consider a higher number of different conspiracy topics" (Bessi et al., 2015, p. 10). In another study, "conspiracist comments mentioned about six times as many other conspiracy theories as being true as conventionalist comments did (0.12 vs. 0.02 per comment)." In contrast, conventionalist comments "made about nine times as many negative references to other conspiracy theories as conspiracist commends did (0.18 vs. 0.02 per comment)" (Wood & Douglas, 2015, p. 3). These patterns are consistent with the general "tendency for conspiracy beliefs to be positively correlated with one another" (Wood & Douglas, p. 3), a finding characterized as "probably the most consistent finding of the research literature so far—the more someone believes in one conspiracy theory, the more they tend to believe in others" (Wood & Douglas, p. 3; see also Lobato et al., 2014; Swami et al., 2011). These patterns suggest a general principle of conspiracist ideation that people hooked by one theory tend to gravitate toward others, resulting in flexible master narratives that reject conventionalist explanations of events and society (Spitzberg, this volume).

Singh et al. (2020a) examined a corpus of 2,792,513 tweets and retweets during the initial wave of the pandemic (January 16 through March 15). They curated a list of 10 myths that had dangerous potential and developed a search ontology to automatically assign myths to tweets based on tweet content. The five myths ultimately selected as most relevant were: (i) flu comparison (i.e., that COVID-19 was no worse than the common flu); (ii) heat kills disease (i.e., that the epidemic will stop with warm weather); (iii) home remedies (i.e., tweets mentioning nonmedical prevention or treatment remedies, such as eating garlic, drinking ginger tea, etc.); (iv) origins of COVID-19 (i.e.,

conspiracy theories regarding bioweapon engineering or design, typically by candidates such as China, US government or military, the liberal media, or Bill Gates); and (v) vaccine development (i.e., statements suggesting that vaccines already exist, or that a vaccine will transmit COVID rather than prevent it). One of the limitations of their analysis is that the tweets could just as likely be attempting to counter such myths as promote them, which could be managed in future analyses through stance detection methods. When investigating the extent to which reputable or irreputable health information sources were cited, out of 21,417,552 tweets and retweets combined, 9.68% contained URLs, of which just 1.25% were on a curated list of high-quality information sources and an equal amount (1.12%) cited low-quality information sources. Thus, while slightly over 40% of all tweets had URLs, only a small fraction of these linked to the most credible sources such as the Centers for Disease Control and Prevention (CDC), World Health Organization (WHO), government health agency, or scholarly peer-reviewed medical journals, whereas disreputable sources were just as likely to be cited.

A report from the Australia Institute analyzed 2.6 million corona-related tweets over 10 days in late March 2020 (Graham et al., 2020). One focus was on bots, operationalized as co-retweets within 1-second of one another. They identified 5,752 accounts that had engaged in such activity. Most of these bots revealed identifiable political agendas, ranging from Turkish curfews, Paraguayan virus mortality rates, to campaigns promoting the ruling Saudi Arabian government. Another focus was on the particular conspiracy theory that SARS-CoV-2 was bioengineered in a Chinese lab as a military weapon. This conspiracy theory was pushed from 2,903 accounts and 4,125 links, mostly (28 of 30 clusters identified) by pro-Trump or QAnon sources. The theory was a connective tissue of 882 original tweets retweeted 18,498 times and liked another 31,783 times, comprising a roughly estimated 5 million impressions among Twitter users. The report concludes that these tweets represent "a sustained, coordinated effort to promote this theory by pro-Trump, Republican and aligned networks of accounts" (p. 3). This is consistent with research that conservatives in the United States tend to endorse conspiracy theories specifically, and conspiratorial worldviews in general, more than liberals (van der Linden et al., 2020). When they analyzed the bioengineering conspiracy theory tweets that met the criteria as bots, over two-thirds were from right-wing, pro-Trump, and anti-China sources. Newsguard also identified Twitter superspreaders, who had follower counts greater than 100,000, each of whom spread COVID-19 tweets with false or misleading information about the pandemic or the virus. According to NewsGuard's analysis, over half of these instances involved some version of the QAnon conspiracy theory that the disease is an instrument of Trump's war to root out his deep state antagonists.

When Scanfeld et al. (2020) analyzed 52,153 tweets classified as "misunderstanding and/or misuse," they conducted a word analysis and found flu + antibiotics; cold + antibiotics; and "leftover," "extra," and "share" as common correlates. These particular word combinations reached a potential 1,045,962 followers at the receiving end of those tweets, or a ratio of 20 followers per misunderstanding or misused tweets.

A study investigating the feasibility of automatic detection of COVID-19 conspiracy theories (Shahsavari et al., 2020) examined 14,712 4chan posts and 4,377 Reddit threads resulting in 87,079 relationships in social media, as well as 324,510 sentence-level relationships in news reports regarding the COVID-19 pandemic between March

28 and April 17, 2020. They found a network structure of three prominent interlinked narratives proposing COVID-19 vaccination (i) as a potential biological weapon, (ii) activated by 5G cellular networks, (iii) as part of a plan by Bill Gates seeking worldwide surveillance capability. The main component across the entire corpus indicated "the centrality of several significant conspiracy theories: (i) that the 5G cellular network is a root cause of the virus and with the lethality of the virus tied to its role as a bio-weapon; (ii) that the virus is linked to laboratories in China" (p. 14). Each of the conspiracy narratives tended to be supported by multiple communities.

There is a clear need to formulate surveillance methods that register the spread of disease disinformation, as well as near real-time signal detection of actual disease symptoms. Providing mechanisms for monitoring and signaling the spread of disease symptoms, as well as disease misinformation, distrust, anger, or confusion states can provide essential strategic targets for health messaging campaigns and interventions (Oren et al., 2020). In 2005, US Health and Human Services (HHS) published a comprehensive influenza pandemic crisis response plan, updated most recently in 2017, in which they emphasized their renewed commitment to "leverage 'Big Data' to improve its ability to monitor and describe influenza disease and conduct epidemiologic studies" and to "use supplemental data sources (such as electronic health records, social media, or big-data repositories) to better monitor and characterize potential pandemic influenza activity in as close to real time as possible" with the intent of utilizing "innovative data sources and models to better forecast disease emergence and patterns" (U.S. HHS, 2017, p. 16). Such systematic surveillance systems represent increasingly standard composite tools in the emerging science of infodemiology (Shi et al., 2019; Spitzberg et al., 2020; Yang et al., 2019; Ye et al., 2018), which

> is an important part of outbreak response. It encompasses three main areas: (1) monitoring and identifying health threats, (2) outbreaks investigation, and (3) actions for mitigation and control. Similarly, successful management of infodemics will be based on (1) monitoring and identifying them, (2) analysis of them, and (3) control and mitigation measures.
>
> (*World Health Organization, 2018, p. 34*)

An evidence-based approach to integrating factors and models that promote valid information diffusion and diminish dismisinformation are clearly a priority going forward (Jensen & Gerber, 2020).

One approach to such surveillance is to investigate the potential for rapidly and efficiently identifying and tracking the development and geospatial infodemiology of such dismisinformation. The COVID-19 pandemic has been so massively disruptive on its own; it is a perfect opportunity to examine the role of dismisinformation in amplifying the virality of the virus. A reasonable place to start are some of the conspiracy theories that have emerged during the crisis. A preliminary study of conspiracy theories relevant to the pandemic that are populating social media has identified the following:

> four main conspiracy theories: (i) the virus as related to the 5G network, explaining both the Chinese provenance of the virus through the connection to the communications giant Huawei; (ii) the release, either accidental or

> deliberate of the virus from, alternately, a Chinese laboratory or an unspecified military laboratory, and its role as a bio-weapon; (iii) the perpetration of a hoax by a globalist cabal in which the virus is no more dangerous than a mild flu or the common cold; and (iv) the use of the pandemic as a covert operation supported by Bill Gates to develop a global surveillance regime facilitated by widespread vaccination. As the conversations evolve, these conspiracy theories appear to be connecting to one another, and may eventually form a single coherent conspiracy theory that encompasses all of these actants.
>
> (*Shahsavari et al., 2020, p. 17*)

There are also other relatively anecdotal lists of conspiracy theories associated with the COVID-19 pandemic (e.g., Carley, 2020; Gregory & McDonald, 2020; Kulkarni et al., 2020). A list of a sampling of these myths identified anecdotally thus far is presented in Tables 12.1(a) and 12.1(b).

Table 12.1 Exemplary myths and conspiracy theories identified in the global discussions of COVID-19

Table 12.1(a) Carnegie Mellon List.

1. Stories relating to inaccurate information about cures or preventative measures or treatments that make it worse ($n = 86$; e.g., 1. gargling with bleach will prevent/cure—also appears as satire; 2. drinking corona beer will prevent/cure—also appears as satire; 3. taking acetic acid will prevent/cure; 4. taking steroids will prevent/cure; 5. taking colloidal silver will cure; etc.)
2. Stories relating to inaccurate information about the nature of the virus ($n = 21$; e.g., 1. Coronavirus is just a cold; 2. COVID-19 is a normal flu and is no more dangerous than that; 3. Children cannot catch coronavirus; 4. SARS-CoV-2 is mutating faster than normal viruses; 5. Pregnant women who have COVID-19 can pass the virus through the placenta to the unborn child; etc.)
3. Stories relating to inaccurate information that are conspiracy stories ($n = 38$; e.g., 1. It was created in a lab; 2. It is a US/CIA created bioweapon; 3. It is a Chinese bioweapon; 4. It is a Russian bioweapon; 5. It leaked from a bio-weapons lab in China; etc.),
4. Stories relating to false diagnosis procedures ($n = 1$; i.e., If you can hold your breath for 10 seconds you don't have COVID-19)
5. Stories relating to inaccurate information about emergency responses ($n = 34$; e.g., 1. NYC is under martial law 3/20; 2. Only people who have tested positive need to stay home and isolate themselves; 3. Only large gatherings have to be stopped; 4. All human interaction needs to be stopped; 5. Coronavirus is spread only by coughing and sneezing; etc.)
6. Stories relating to inaccurate but funny or feel-good stories ($n = 6$; e.g., 1. Pandemic caused Venice's water to be clear so the swans returned; 2. Pandemic caused Venice's water to be clear so the dolphins returned; 3. Elephants break into a village due to social distancing and get drunk on corn wine; 4. Sri Lankan Sambar deer graze on Yala Park beach; 5. Deer walking down streets in Ciudad Real, Spain; etc.)
7. Stories relating to social misbehavior ($n = 14$; e.g., 1. Kerala migrant laborers gambling with huge stashes of money; 2. Hindu man in Rajasthan killed by Muslims amidst the lockdown; 3. Starving family in India commits suicide; 4. Americans placed a nude statue of President Trump in NYC because he failed to handle the US situation; 5. Criminals handing out masks with chemicals to make people pass out so they can commit robbery; etc.)

Source: Carley (2020). © 2020, Carnegie Mellon University. https://www.cmu.edu/ideas-social-cybersecurity/research/coronavirus.html (April 16, 2020).

Table 12.1(b) NewsGuard List.

1. "The COVID-19 virus was stolen out of a Canadian lab by Chinese spies."
2. "The COVID-19 virus contains 'HIV-like insertions', suggesting it was engineered."
3. "The COVID-19 pandemic was predicted in a simulation."
4. "A group funded by Bill Gates patented the COVID-19 virus."
5. "The COVID-19 virus is a manmade bioweapon."
6. "5G cell phone technology is linked to the coronavirus outbreak."
7. "Colloidal silver can cure COVID-19."
8. "Miracle mineral solution can cure COVID-19."
9. "Garlic can cure COVID-19."
10. "High doses of vitamin C have been proven to be an effective treatment for COVID-19."
11. "Lemon and hot water can cure COVID-19."
12. "The Italian government is preventing migrants from being tested for COVID-19."
13. "Bill Gates plans to use COVID-19 to implement a mandatory vaccine program with microchips to surveil people."

Source: Gregory and McDonald (2020). © 2020, NewsGuard. https://www.newsguardtech.com/covid-19-myths.

The following pilot project illustrates how such conspiracy theories might be monitored as they diffuse. Based on a review of literature, a balance of conspiracy theory keywords (i.e., 5G "covid" OR "corona"; 5G coronavirus; Gates "COVID" OR "coronavirus"; Plandemic) and fake news (i.e., methanol "covid" OR "corona"; methanol coronavirus; Hydroxy OR chloroquine; vitamin "covid" OR "coronavirus"; malaria "COVID" OR "coronavirus") were used to select tweets. These tweets were sampled from six large metropolitan areas across the United States (see Table 12.2).

Methodology

We utilized a social media analytics and research testbed (SMART) dashboard for monitoring Twitter messages and tracking the diffusion of fake news and conspiracy theories using relevant keywords from March 23, 2020 to April 26, 2020. The SMART dashboard is an online geo-targeted search and analytics tool developed by the Center for Human Dynamics in the Mobile Age (HDMA) at San Diego State University in 2014

Table 12.2 Key data points on surveillance cities.

City	Population	Lon	Lat	Radius-Mi	UTC
San Diego	3223096	−116.839	33.020	52	(PDT) −7
New York–Jersey City–Newark	12092148	−73.99654	40.73941	20	−5
Los Angeles–Long Beach	8278884	−118.24368	34.05223	20	(PDT) −7
Houston	3924519	−95.36327	29.76328	20	−6
Miami–Hialeah	4037603	−80.19366	25.77427	30	−5
Phoenix–Scottsdale–Glendale–Mesa– Gilbert–Chandler	4052019	−112.07404	33.44838	40	−7

Notes: Lon (longitude), lat (Latitude), Radius-Mi (Radius in miles from center), UTC (universal time clock).

(funded by an NSF project). The SMART dashboard includes an automatic Twitter data processing procedure to help researchers to (i) search tweets daily in different cities; (ii) filter noise (such as removing redundant retweets); (iii) analyze social media data from a spatiotemporal perspective, and (iv) visualize social media data in various ways (such as weekly and monthly trends, word clouds, top URLs, top retweets, top mentions, or top hashtags). By monitoring social messages in geo-targeted cities, the SMART dashboard can assist researchers investigate and monitor various topics, such as flu outbreaks, drug abuse, and Ebola epidemics at the municipal level (Tsou et al., 2015; Yang et al., 2016). This dashboard can help domain experts to efficiently conduct the refinement, formalization, and testing of research hypotheses or questions (Yang et al., 2016).

In early 2018, a new version of the SMART dashboard (2.0) was created. The SMART dashboard version 2.0 (http://humandynamics.sdsu.edu/SMART2.0.html) improved the user interface and keyword input functions significantly, allowing users to enter multiple keywords and easily set up the radius for targeted cities. The server-side program also improved the frequency of data collection from updating daily to updating every 10 minutes due to the need of rapid disaster responses, such as wildfires and hurricanes. The SMART dashboard 2.0 can provide data visualization in various formats such as the temporal change of the tweet frequency, word cloud, most shared images, and top-10 most retweeted tweets. Smart dashboard 2.0 can collect both geotagged tweets and non-geotagged tweets in real time, and it can back-date collection of social media data up to 7 days.

For example, any tweets can be collected containing "coronavirus" or "COVID-19" within what is typically a 30-mile radius buffer area outward from the center of major US cities. Table 12.2 illustrates the six major surveillance cities we collected for this study. The following figure (see Figure 12.1) is a screenshot of the SMART dashboard 2.0 for COVID-19 fake news in San Diego (with 52 radius) from April 08, 2020 to May

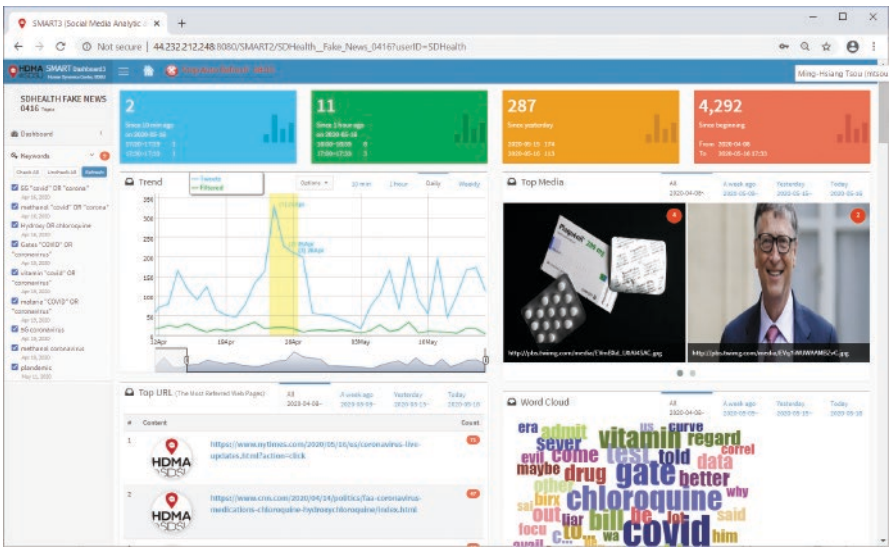

Figure 12.1 The SMART 2.0 dashboard of San Diego with Fake News topics. *Source:* The Center for Human Dynamics in the Mobile Age, San Diego State University. http://44.232.212.248:8080/SMART2/SDHealth__Fake_News_0416?userID=SDHealth.

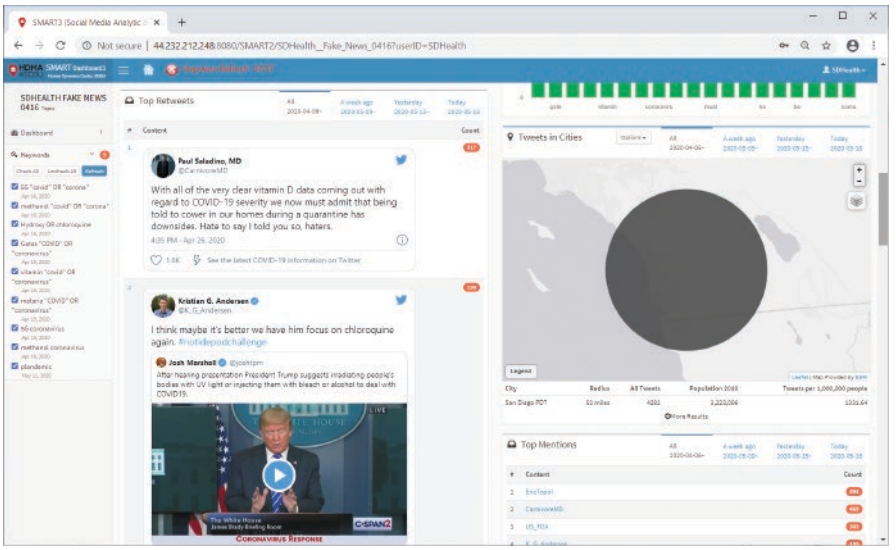
SDHEALTH FAKE NEWS 0416
Top Retweets
Tweets in Cities
Top Mentions
Paul Saladino, MD
With all of the very clear vitamin D data coming out with regard to COVID-19 severity we now must admit that being told to cower in our homes during a quarantine has downsides. Hate to say I told you so, haters.
Kristian G. Andersen
I think maybe it's better we have him focus on chloroquine again. #notdeepdotchallenge
Josh Marshall
After hearing presentation President Trump suggests irradiating people's bodies with UV light or injecting them with bleach or alcohol to deal with COVID19.
CORONAVIRUS RESPONSE

Figure 12.2 Screenshot of SMART 2.0 COVID dashboard for San Diego. *Source:* The Center for Human Dynamics in the Mobile Age, San Diego State University.

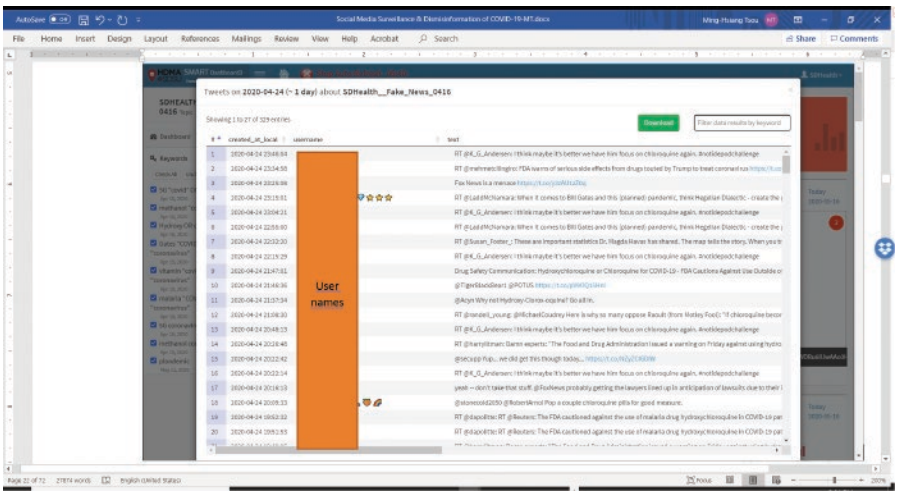

Figure 12.3 Screenshot of SMART 2.0 COVID-related tweets. *Source:* The Center for Human Dynamics in the Mobile Age, San Diego State University.

16, 2020 with 4,292 tweets. Figure 12.2 shows the key functions of the SMART dashboard 2.0 with the automatic summary of the top-10 retweets and top-10 mentions. Figure 12.3 is a screenshot illustrating some sample of tweets in each date.

Results

The tweet sample discussed in this section was collected between March 23 and April 26, 2020 in San Diego and five other major US cities consisted of tweets containing any

Table 12.3 Top 10 hashtags in a dataset of 600 K tweets.

Hashtag	N
BREAKING	
#NEW	6,868
#DEVELOPING	3,703
#SanDiego	2,580
#SmartNews	1,987
#WATCH	1,174
#healthcare	1,146
#Tijuana	1,174

of the following keywords: covid, pandemic, coronavirus, COVID-19, nCoV, Wuhan, quarantine. We selected San Diego as our major targeted city for social media analytics. The majority of the discussion in these tweets centered on public health issues. That is, it was primarily a discussion among individuals who believed in the reality of the virus and in the severity of the threat it posed, centering less on the source of the pandemic and more on news, methods, and resources for combatting the virus. This is demonstrated by the dominant hashtags in the data (San Diego only). Table 12.3 shows the top 10 hashtags in the above collection of the 21.7% (n = 130 K) tweets with hashtags, with hashtags overlapping with the keywords removed.

In addition to the general concern with health and quarantine issues, the top hashtags give evidence of a strong media presence in the tweets. Similar trends can be observed in the tweets of the top 25 users.

While such mainstream topics during a pandemic are expected, at the periphery of the chatter, there is a strong and persistent pattern of dismisinformation, evidenced in a number hashtags either directly related to the dismisinformation themes discussed above or strongly associated (in a way to be defined below) with one of them, including but not limited to the following (case-folded).

> #30moredays #agenda2019 #americafirst #anons #anonymous #antibillgates #antivax #billgatesisevil #blowtheswamphole #cabal #cabaltakedown #canyouseeanythingq #conservatives #conspiracytheories #coronavirus #coronaviruscure #coronavirustruth #covid #covid19 #covidiots #cures #darktolight #dearmrpresident #deepstate #deepstatetakedown #democratsfortrump #draintheswamp #epsteindidntkillhimself #evil #evilgenius #factsfirst #factsmatter #fakenews #firefauci #followthewhiterabbit #freedom #gatesfamily #gatesfoundation #gitmo #gitmobungeenoosing #greatawakening #hacked #health #hydroxychloroquine #joeexotic2020 #justice #kag #killcabal #liberallogic #liberals #lockdown #maga #manga #molach #notmynormal #openamericanow #owl #patriot #patriots #patriotsfight #patriotsunited #payback #pizzagate #plandemic #potus #potus45 #qanon #qanon8cha #qanon8chan #qanons #qarmy #qmaildrops #quarantine #quarantinelife #redpi #redpill #refusethevaccine #repost #satanic #saveamerica #stayhome #testsrecalled

#thegr #thegreatawakenin #thegreatawakening #thegreatawkening #thesepeoplearesick #thestorm #thestormisuponus #timetravel #trump #trump2020 #trusttheplan #truth #unitednotdivided #virus #wakeup #wakeupamerica #wakeupworld #walkaway #wearethenewsnow #wethepeople #wethepeopleinsider #who #wuhan #wwg1gwa #wwg1wga #wwg1wgaworldwide

A significant point is that, of the tweets containing a hashtag, 27.8% contain more than one hashtag. That is, the tags have a strong tendency to travel in groups, and there are strong associations between tags. The same is obviously true of words, too. Associations between words are called *collocations* by linguists (Firth, 1951; Halliday, 1961; Sinclair, 2004), and this term is extended here to cover hashtags. For our purposes, two words or hashtag w1 and w2 are collocated when they occur frequently within the same tweets. The collocation relation is used to build word and hashtag graphs, connecting words that often co-occur in the same tweet.

The collocation relation is not sufficient to reveal all the important concept relations in Twitter data. Twitter presents a somewhat unique situation for language analysis in that there are significant associations not just within tweets but also in time. Hashtags or words may display strong associations by occurring repeatedly at the same time. Words or hashtags that have similar temporal profiles are referred to as *synchronized*. Words that are collocated are by definition somewhat synchronized, but the converse is not necessarily true. Words or hashtags that are synchronized may simply be referring to the same event without ever occurring in the same tweet. Figures 12.4 and 12.5 show the distribution pattern for two hashtags that are not terribly common yet tend to appear at similar times: "#billgatesisevil" and "#pizzagate." By contrast, in Figure 12.6, we see a hashtag with a very different distribution pattern "#covidiots." In studying an extended months-long event such as the Covid pandemic, synchronization may seem less important than collocation, because the subject matter remains

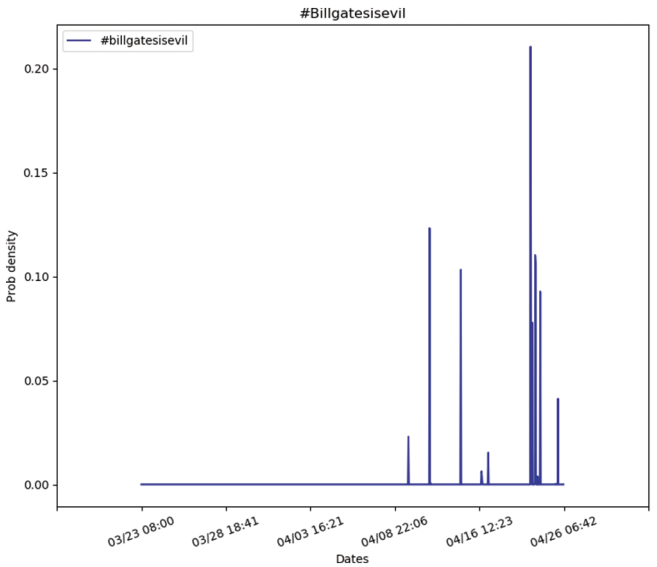

Figure 12.4 Word distribution for #billgatesisevil.

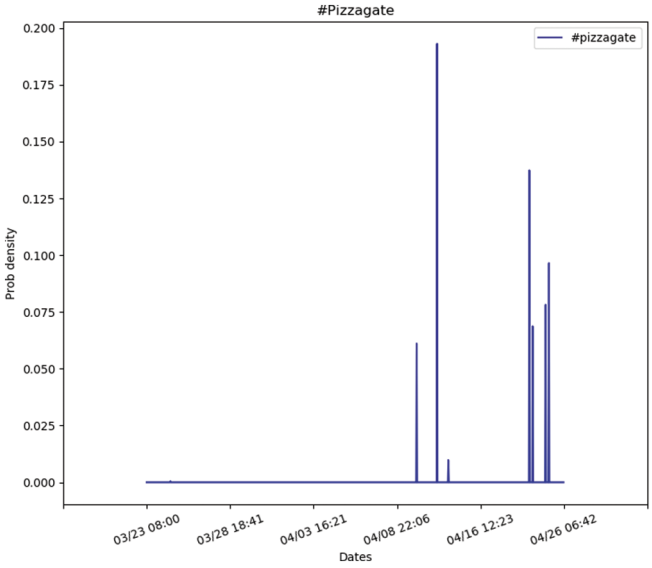

Figure 12.5 Word distribution for #pizzagate.

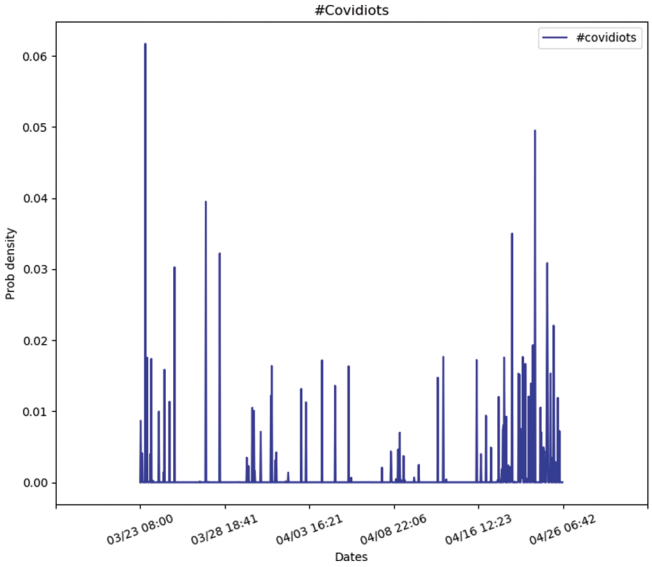

Figure 12.6 Word distribution for #covidiots.

relatively static, but these examples show that there can be great variability in the temporal distributions of words. As a result, synchronization, when it happens, can be revealing because of the conversational nature of Twitter. The occurrence of one hashtag in an influential tweet provokes a flood of response tweets, both concurring and opposing, all of which are roughly synchronized.

A number of hashtags related to dismisinformation have strong collocation and synchronization properties. The same kind of relationships related to Covid myths occur among words as for hashtags, such as the following:

> Gates network lab laboratory pharma China Chinese Huawei virus Wuhan hoax quarantine surveillance cure silver mineral steroid garlic bleach vitamin c microchip microchips WeThePeople

To demonstrate the tendency of certain hashtags and words to synchronize, we constructed a synchronization graph in which hashtags and words were nodes and a link between nodes represented strong synchronization. To measure synchronization, we followed McClure (2015), representing the distribution of a word through time with a kernel density estimate and used the Bray-Curtis distance between the Gaussians to quantify synchronization. For example, if the frequencies of hashtags h1 and h2 always peaked at similar times, they would be linked. For help in visualizing the result, a community discovery algorithm (Blondel et al., 2008) was applied grouping words into natural "synchronization" communities. Figure 12.7 gives an overview of all the communities. Normally, these would be colored to separate them clearly, but the layout algorithm in fact generally agrees with the community discovery, so that nodes collected into large clusters in the image in fact tend to belong to a community chosen by the community discovery algorithm.

Figure 12.8 zooms in on a large central community that collects a number of words and hashtags widely and evenly distributed through the data, including words such as "China," "Wuhan," and "Trump" (see Figure 12.6 of "#covidiots"). Figure 12.9 zooms in on the cluster of most interest here, the somewhat diffuse community on the far right. The fact that it is peripheral suggests that the conversational elements pictured do not overlap much with the more coherent conversational communities in the center. What makes this community significant for our purposes is that the cluster consists of a mixture of anti-hashtags, meaning hashtags indicative of disbelief or discrediting the validity of mainstream accounts or the seriousness of the pandemic. This includes messages regarding anti-Covid hashtags, anti-Covid policy, Covid dismisinformation hashtags, conspiracy theory tags, and political affiliation tags, such as "#billgatesisevil," "#gatesfamily," "#gatesfoundation," "bleach," "garlic," "#refusethevaccine," "#factsmatter," and "#openamericanow." Recall that all tweets contain a Covid-related keyword, which strongly suggests that all these words should be interpreted in connection with COVID-19. Inspection of the data confirms this. For example, almost all the tweets in this dataset referring to Gates impute some dark connection to the pandemic. As an example, consider this widely retweeted tweet with the hashtag "#GatesFamily":

> 2020-04-21:21 Tokyovenus1 Just a friendly reminder that the #gatesfamily was kicked out of india for this 100 proven #billgatesisevil #plandemic #followthewhiterabbit #antivax #covid—19 #thesepeopleareSick #wwg1wga #coronavirus #refusethevaccine #notmynormal #killcabal q #qanon #patriot #wakeup

The peripheral community (which consists almost entirely of hashtags) also contains several hashtags related to non-Covid conspiracy theories or conspiracy communities including "#Pizzagate," "#antivax," "#refusethevaccine," and "#conspiracytheories." A number of the other hashtags are indirectly related to QAnon, a conspiracy group launched by an anonymous writer who goes by the name of "Q" and writes about an

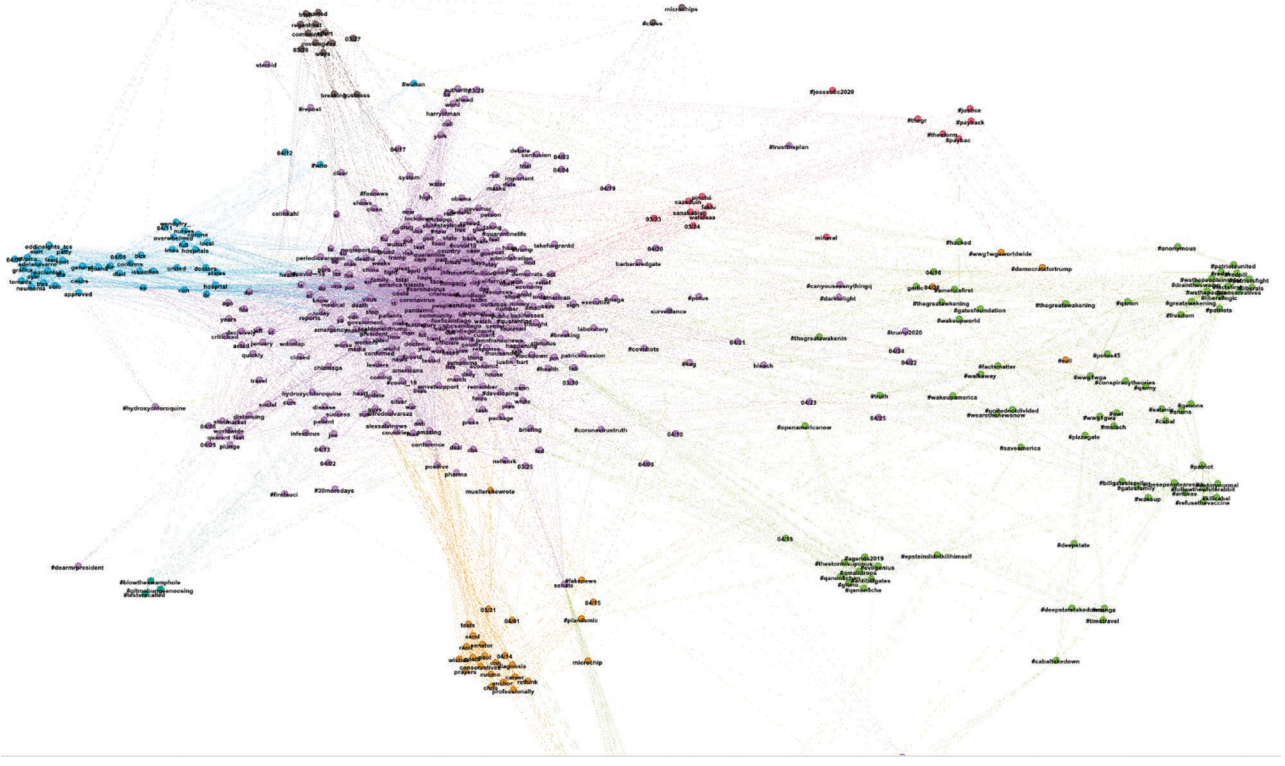

Figure 12.7 Overview of the synchronization graph.

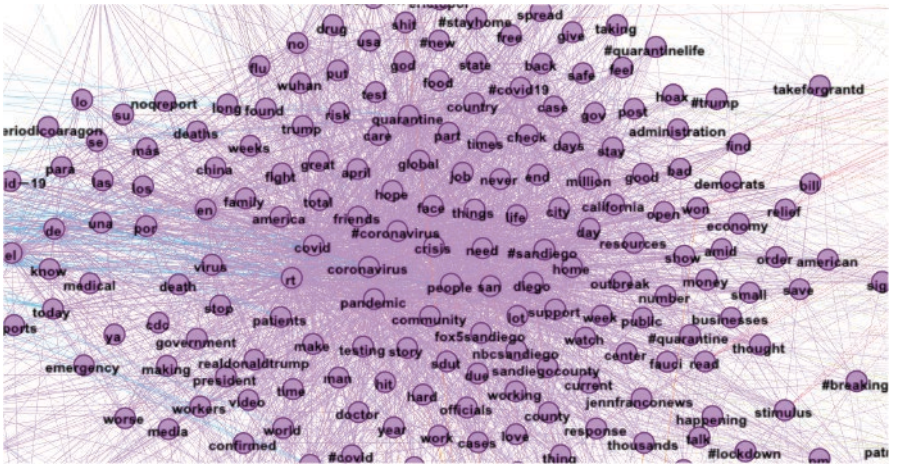

Figure 12.8 Central community of synchronization graph.

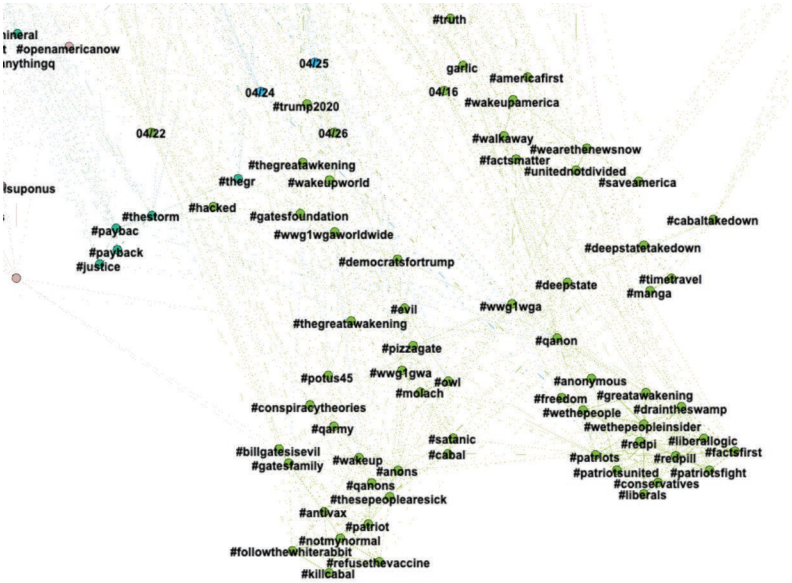

Figure 12.9 The conspiracy community of the synchronization graph.

ongoing "deepstate conspiracy" against President Trump. The Q-related tags include variants of "greatawakening," "ww1gwa" (a group slogan: "Where we go one, we go all"), and consistent "QAnon" themes, such as "#thestormisuponus" (the "storm" comes when the conspiracy against President Trump is exposed and the conspirators are arrested) and "#deepstate." Because of its strong connection to a larger network of conspiracy ideas, this peripheral community is labeled the *conspiracy community*. Notably, the conspiracy community also includes a number of political slogans and movement references such as "#wethepeople," "#draintheswamp," and "#walkaway." It is also noteworthy that as of early July 2020, as many as 59 congressional candidates

in the United States had in some way endorsed, expressed, or forwarded QAnon conspiracy content (Kurtzleben, 2020).

Further evidence about what words and hashtags co-occur comes from looking at collocational information, which more clearly reveals the political dimensions of certain Covid myths. To investigate collocational properties, we built an M × M matrix recording for each of the M vocabulary words regarding how many times each word occurs in the same tweet with it. We then built an M × M similarity matrix, recording for each word how similar the co-occurrence patterns of all the other words are. Table 12.4 shows the 10 nearest neighbors for some important words in the dataset. The first two columns show the contrast between the nearest neighbors of the very frequent collection keyword "#pandemic" and the denialist variant "#plandemic."

The keyword "#pandemic" reflects very general trends in the Twitter Covid conversation that it is political ("#republicans," "#evangelicals," "#gop," "#potus"), concerned with health practices ("#washyourhands"), and critical of Covid deniers and folk remedy believers ("#covidiots"). Countering that, there are two far less frequent hashtags "#plandemic" and "#fakenews," which have very similar nearest neighbors and that are both associated with a denialist stance toward the pandemic. The two tags are neighbors of each other, and some of their shared nearest neighbors are near synonyms encoding the "Corona is a hoax" myth ("#coronacrap," "#coronahoax," and "#wakupamerica"). In addition, they are strongly connected with the Bill Gates vaccine-related corona myths ("#billhates," "billhates"). In a somewhat different mode, "#qanon," which was encountered as part of the conspiracy community in the synchronization graph, is more overtly politicized here ("#kag," "#maga," "#trump2020"), but still connected to the Covid denialism ("#coronahoax"). It is worth noting that "#plandemic" and "#coronacrap" are ranked 22nd and 24th among its nearest neighbors, trailing a large cluster of political words like "#donaldtrump," "#potus," and "#republicans."

What these patterns indicate is that certain kinds of dismisinformation tend to cluster together. The anti-vaccination movement is strongly associated with the "covid is a hoax" theme. Among the conspiracy themes gathered under the umbrella of #QAnon

Table 12.4 Nearest neighbors (and counts) for four words.

#pandemic (1478)	#plandemic (116)	#qanon (79)	#fakenews (221)
#republicans	#coronacrap	#cnn	#coronahoax
#evangelicals	#coronahoax	#kag	#wakupamerica
#gop	#billhates	#maga	#coronacrap
#selfisolation	#wakupamerica	#chinesevirus	#plandemic
#covid19usa	#_conrad	#trump2020	#billhates
#potus	#fakenews	#21	#21
#992	#1221	#coronahoax	#_conrad
#washyourhands	#chinesevirus	#wakupamerica	#billgates
#covidiots	#feels	#evangelicals	#china
#florida	#992	#memsdaily	#cnn

are found "Bill Gates" and Covid denialism, along with the deep state conspiracy and the fictional child sex trafficking ring associated with Pizzagate. Bill Gates is one of the most common conspiracy theory constructs regarding the pandemic (Wakabayashi et al., 2020). All this suggests that in characterizing this phenomenon, it may be less important to look at the truth or falsity of what is said than it is to look at what narratives are being furthered. The following tweet illustrates this confluence of conspiratorial disinformation:

> 2020-04-10:16: chronsweet @sydrasmith @kimstrassel @realdonaldtrump @wsj the real tragedy is the millions of kids in this country with autism and autoimmune conditiond [sic] because of forced vaccinations not people in their 80s dying from ailments they have had for years and then labeling them covid use ya brain

Here, the "COVID is a hoax/overblown" theme is coupled with the classic anti-vaccination theme of forced vaccinations and resulting autism. The potential for these two themes to resonate seems clear: The anti-vaccine movement teaches that the dangers of infectious disease are overblown because of the huge profits pharmaceutical companies ("BigPharma") stand to make from vaccinations. Covid-19 is another infectious disease, very likely to lead to a vaccine, providing big pharma with yet another opportunity to blow a threat out of proportion and reap in huge profits.

At this juncture, it makes sense that the Bill Gates/microchip story then resonates perfectly, leading to tweets like the following:

> 2020-03-28:03:11 and1morething @kasiagtv @fox5sandiego @kevin_faulconer @sdmayorsoffice careful san diego you have some major players involved with #event201 @billgates and the coronavirus lab in wuhan do your research before getting a vaccine getting a vaccine will make you a carrier and able to infect others if the goal is microchip
>
> 2020-04-28:06:07 JGray1221, thanks for showing more of your hand you first want to vaccinate us then microchip us no thanks #billgates #who #corona #coronavirus'
>
> 2020-04-19:05:47 lbastura RT @sdmattpotter bill gates coronavirus false misinformation vaccine microchips

All three tweets link vaccination with Bill Gates and microchip implants; the first links that with a long-standing myth taught by the antivax movement that getting vaccinated actually leads to being infected.

What the community discovery algorithm indicates is that these hashtags synchronize more with each other than they do with other tags. Besides exercising the Bill Gates dismeme, the #GateFamily tweet quoted above illustrates another feature typical of conspiracy community tweets. It contains a veritable flurry of hashtags, suggesting a possibility that appears to characterize much of the data. One kind of misinformation attracts others. This suggests a rhetorical strategy by which ideas are promoted by connecting them with a hashtag that already has many followers, especially if that hashtag expresses an idea naturally connected to the message being promoted.

Further evidence of the strong coordination of Covid dismemes occurs in the outputs of single users. Below is a pair of tweets from RedPillKen (whose account was recently suspended by Twitter for unspecified rule violations). One tweet disseminated the "Corona is hugely overblown" dismeme, and the other promoted the "the effectiveness of hydroxychloroquine." The apparent contradiction between these messages (Why worry about the correct treatment of Covid if the seriousness of the threat is wildly exaggerated?) is apparently less important than consistently contradicting what healthcare experts are saying.

> 2020-04-02 14:11:05 RedPillKen RT @BarbaraRedgate 12 Experts Questioning the Coronavirus Panic This is a virus with a huge PR machine behind it ...
>
> 2020-04-23 13:07:39 RedPillKen RT @wdunlap @kerpen @PittsTracy How many Americans will lose their lives to anti Trump war on hydroxychloroquine Amazing success stories

The patterns observable in these data seem to lead to two important takeaways: First, denialism unites the different themes in the conspiracy community tweets and the related hashtags. Something accepted as true (often long-accepted) by the so-called experts and the gullible general public is actually false. Vaccines do not prevent infectious diseases. In fact, they harm you. Climate change is not happening. The earth is not round. Experts of all kinds encounter denialism, but medical experts like Dr. Anthony Fauci seem to be a particular target, and therefore the Covid conversations, with their rich supply of hashtags attacking healthcare professionals, provide a wonderful field for a whole range of denials, from the reality of Covid right down to the reality of germs as an agent of infection, as in:

> 2020-04-20 21:59 alconrad Germ theory A deadly fallacy #firefauci #covid #EndTheShutdown

In sum, the tendency for memetic narrative structures to be integrated and accumulated as additive branches on a viral tree supports the general finding that those who believe in any given conspiracy theory are prone to adhere to other conspiracy theories (Huneman & Vorms, 2018).

A second implication of these data is that these messages can be tracked and studied by their structural features because they co-occur. The messages discussed here are peripheral; this makes it a challenge to find and analyze them. They show up with the analytical tools used here because they were reinforced and amplified within a small group of users by the internal forces of Twitter, thereby receiving the benefits of that powerful musical principle, "Repetition legitimizes" (Neely, 2020). In contrast to these repeated themes, there are all kinds of Covid-related myths that are put out there and remain unnoticed, in part, at least, because they do not resonate with any prevailing denialist themes.

> 2020-04-27:20 RockyShorz ... UV nano particles trained to track down and destroy covid without damaging organs will be here soon enough ...
>
> 2020-03-29:20:14 natalirhmzdh RT @_dankob this song just cured my grandmas coronavirus

The bewildering variety of untruths uttered about COVID suggests a productive but rather random mechanism at work. We may never be able to catalog all Covid myths, simply because new ones come into being all the time, but the mechanisms observed here suggest that the most repeated myths may be tracked, and that best techniques for finding and understanding those successful myths will involve tracking the user networks through which they travel and the messages with which they co-occur. What characterizes conspiracy theories is that the search for pattern has become more important than the search for truth; the more memes that can be accommodated into a single community of conspiracy memes, the more powerful the argument for a single pattern that explains many things (Leal, 2020). Thus, these data support the hypothesis that conspiratorial thinking may be a unidimensional or monological cognitive orientation (Goertzel, 1994). As Andrade (2020) speculates, "inasmuch as everything is connected in a grand conspiracy, the single best predictor of belief in one conspiracy theory is belief in a different conspiracy theory" (p. 5). Such a tendency is obviously likely to be symbiotic with principles of homophily and echo chambers (Avnur, 2020; Choi et al., 2020; Leal, 2020; Spitzberg, 2019).

Limitations

Different platforms, cultures, and languages can produce different conversations about epidemics and the narratives and conspiracy theories attributed to such outbreaks (Wirz et al., 2018). An analysis of over 8 million messages across five social media platforms found that "mainstream platforms are less susceptible to misinformation diffusion. However, information marked either as reliable or questionable do not present significant differences in the way they spread" (Cinelli et al., 2020, p. 3). Thus, the underlying structure of information diffusion may not be platform-specific. However, this same study did find significant differences in the proportions of responses to unreliable posts (e.g., in the Gab platform, "the volume of reactions for unreliable posts is ≈ 270% bigger than the volume for reliable ones," p. 7). They also found that of the four platforms that could be estimated (Twitter, YouTube, Gab, and Reddit), Twitter was the most neutral or balanced in the dynamics of reliable and unreliable spreading. Some misinformation is also likely to be region- or culture-specific and, thereby, lost in overly macro-level analytics. For example, the belief that cow's urine or application of mustard oil to the nose have therapeutic value in preventing COVID-19 may be relatively specific to India and its cultural emphasis on ayurvedic medicine (Kulkarni et al., 2020).

Tilting Toward Truthiness

A recent treatise by the Rand Corporation has ominously warned of the extent to which society is suffering from "truth decay." Others draw attention to those who infect public media with toxicity to distort, corrupt, or control the narrative (Salminen et al., 2020). There appears to be a confluence of macro-level factors facilitating such truth decay. For example, Schefulele and Krause (2019, p. 7666) point to several

> "social mega-trends," which arguably contribute to the spread of misinformation in the United States: (i) a decline in social capital, (ii) growing economic inequalities, (iii) increasing political polarization, (iv) declining trust in science, (v) politically asymmetric credulity (i.e., conservatives and liberals are differently susceptible to misinformation), (vi) evolution of the media landscape (e.g., filter bubbles, incivility, and heightened outrage), and (vii) a fractioning of the media that rewards political extremism.

In this dynamic societal context, the risk and public health literatures are strewn with claims that inevitably appear prescient in retrospect. For example, SteelFisher et al. (2015) examined the extent to which public misinformation and misunderstanding regarding the Ebola outbreak corresponded with misplaced public priorities. Their prognosis was that "we are likely to see other emerging infectious diseases quickly become top domestic health concerns. If that happens, we run the risk of substantially altering policy actions and spending in ways that do not serve the greatest domestic or global health needs" (p. 791). This certainly seems an apt description of the US policy status circa mid- to late-2020. In 2018, Larson predicted that dismisinformation underlying anti-vaccination beliefs would become the next highly fatal pandemic—that it would not be the lack of an effective vaccine, but the reluctance of people to avail themselves of a viable vaccine that would represent the most threatening aspect of a disease outbreak. One year after Larson's prediction, Bjørkdahl and Druglitrø (2019) ominously presaged that "in a future pandemic, effective use of digital media could mean the difference between marginal and massive loss of human lives" (p. 76). Yet, such trends and prognostications do not substitute for good theory, and research programs on infodemics thus far are nascent and generative and still have not formulated a core or integrated set of approaches or conceptual models (Spitzberg, this volume; Sunstein & Vermeule, 2009).

Moving forward, when vaccines for COVID-19 (SARS-CoV-2) become available, it is likely that misinformation, disinformation, and general politicization will circulate to diminish public motivations to get vaccinated. Evidence indicates that belief in anti-vaccine conspiracy theories corresponds to diminished vaccination intentions (Freeman et al., 2020; Jolley & Douglas, 2014). Research across 20 public opinion polls in the United States during the 2009–2010 H1N1 outbreak demonstrated that "in the event of a future influenza pandemic, a substantial proportion of the public may not take a newly developed vaccine because they may believe that the illness does not pose a serious health threat, because they (especially parents) may be concerned about the safety of the available vaccine, or both" (SteelFisher et al., 2010, pp. 365–366). Indeed, an Associated Press/NORC surveys in May and then in November 2020 of over 1,000 US adults estimated that approximately a quarter of the population are unsure, and another quarter intend not to get a coronavirus vaccine, meaning that only approximately half of the population fully intends to get vaccinated (Neergaard & Fingerhut, 2020), although some polls have indicated that closer to 70% said they would get the vaccination (Hamel et al., 2020), moderated by political leaning (conservative: 59%; moderate: 70%; liberal: 79%) (Reiter et al., 2020). A Gallup (2020) poll of 7,632 US adults conducted between July 20 and August 2, 2020 found that over a third (35%) would not get a COVID-19 vaccine even if it were offered free. The fact that

this attitude is founded in part in ideological beliefs is illustrated by the difference between Democrats (19% would not), Independents (41% would not), and Republicans (53% would not). An NPR/PBS Newshour/Marist Poll (2020) poll of 1,261 US adults in early August 2020 asked, "If a vaccine for the coronavirus is made available to you, will you choose to be vaccinated or not?" 35% indicated "no" (25% Democrat, 35% Independent, 44% Republican) and 5% indicated "unsure." A YouGov survey in mid-July 2020 of 1,500 US adults found that 25% would not get a vaccine, and 28% indicated they were not sure (Bruce, 2020). A survey of 2,050 US adults in mid-October by Stat and Harris Poll found that interest in getting a Covid-19 vaccine had dropped substantially even from August, from 69% to 58% (Silverman, 2020). A PEW survey of 10,093 US adults found that intent to "probably" or "definitely" get a COVID-19 vaccine "if it were available to them today" declined sharply from May (72%) to September (49%) during the pandemic. The intent, but not the decline, was politically moderated, with intent shakier among Republican-leaning (65% to 44%) than Democrat-leaning (79% to 58%) adults. Further, 78% overall indicated a concern that the approval and testing process was moving too fast, and about a third (35%) experienced a lack of trust in the development process (Tyson et al., 2020). An Ipsos (2020b) poll of 1,115 US adults in late December found that, despite over 80% being somewhat or very concerned about the spread of false information in general, and about the coronavirus and vaccines in particular, only 54% stated that they "will take the COVID-19 vaccine" when available (65% Democrat, 49% Republican). Although almost three-quarters (74%) agreed that "masks are an effective tool to prevent the spread of COVID-19," the partisan divide was substantial (90% Democrat, 61% Republican).

Across most countries studied, there is relatively widespread public support for non-pharmaceutical responses to infections, such as avoiding places in which people gather and wearing masks in public (SteelFisher, Blendon, Kang et al., 2015; SteelFisher et al., 2012), although such opinion polls have generally not been examined in extended pandemic contexts to ascertain the extent to which such support may wane or become politicized over time. One study from April to November 2009 during the H1N1 outbreak in the Netherlands did find that trust in the government began high but diminished over time, although intentions to adopt various protective measures increased during this time. Intention to get vaccinated increased with greater trust in the government, greater perceived personal vulnerability, and greater fear or worry (Van der Weerd et al., 2011). An analysis of trust surveys across over 75,000 respondents in 138 countries concluded that global epidemics have corresponded with diminished trust in scientists, and this effect is stronger among those with less training in scientific subjects (Eichengreen et al., 2020). The Ipsos (2020b) poll found that almost three-quarters (74%) agreed that "masks are an effective tool to prevent the spread of COVID-19" (65% Democrat, 49% Republican), but of the approximately two-thirds (64%) who agreed that there should be a law in their state "requiring mask usage in public, at all times," there was a sharp partisan divide (85% Democrat, 45% Republican).

There is a clear need for a theoretically and empirically driven strategic communication toolbox for managing dismisinformation in the digital medium (Campan et al., 2017). The importance of developing such tools, and the ability to implement strategies for even marginal inflections of the infection curve, is indicated by two related estimates. The first is that by one estimate, in the United States alone, "during a 3-week

period in late February to early March, the number of US COVID-19 cases increased more than 1,000-fold" (Schuchat, 2020, p. 554). The second is a recent agent-based modeling study on other epidemic diseases, which found that reducing false or harmful advice being circulated by just 10%—from 50% to 40%—mitigated the influence of bad advice on the outcomes of a disease outbreak, and that constraining or counteracting 20% of the population from sharing such advice had similar effects (Brainard & Hunter, 2020; Brainard et al., 2020), although they cautioned that even if 10% of information about a viral outbreak is false, the disease will continue to spread. Other modeling indicates that if the structure of a diffusion network is well-known, various strategies in which given nodes in that network are "immunized" and/or replaced can often stop misinformation cascades (Wang et al., 2019). Thus, it becomes imperative that the strategic toolbox for managing misinformation be versatile, adaptive, and effective. One approach to this is to monitor the diffusion of messages and their affiliated beliefs, as well as the communities that serve as the vectors of such viral communication (Caballero, 2020).

Conclusion

This chapter began by suggesting the parallels in the analogy between viral disease and viral communications. It is apropos to close with an extension of this analogy. Gallotti et al. (2020) found evidence that as an epidemic spreads into a country more and more, the more the population tends to engage in information-seeking for more reliable sources of information and more credible influential sources. In other words, as the population becomes more infected, its natural immune system signals the search for deployment of stronger more resilient informational antibodies in the form of more reliable information.

Darwinian notions can also be invoked, if perhaps cynically, in that conspiracy-leaning tweets appear less likely to be diffusing health/prevention information, and more likely to be recirculating their own ideological perspective. For example, believing that COVID-19 conspiracy theories or that the pandemic is a "hoax" is negatively related to the likelihood of seeking vaccination once one becomes available (Imhoff & Lamberty, 2020; Romer & Jamieson, 2020). Socially mediated interactions regarding vaccines have shown connection to vaccination attitudes, as well as some potential for providing more scientific messages that can mitigate false beliefs (Chan et al., 2020). A survey of UK adults found that acceptance of any of three common conspiracy beliefs about COVID-19 (i.e., laboratory creation, 5G mobile networks, and government and/or pharma engineering) correlated negatively with several recommended health prevention behaviors: spending less time outside of home, social distancing, and handwashing (Allington & Dhavan, 2020). This suggests that conspiracy theorists and those taken in by fake news and disinformation may be less likely to adapt their behavior in ways that enhance their odds of survival in the population and will thereby be more likely a victim of the disease that they either discount exists, or that they believe is targeting their survival. In short, conspiracy theory and fake news are not only viral, over time, they tend disproportionately to kill their hosts. The hope for humankind, therefore, is that the arc of truth is more adaptive than that of deception.

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13

Science Communication and Inoculation

Mitigating the Effects of the Coronavirus Outbreak

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> *Science communication is a significant field of enterprise worthy of ongoing practice and research.*
>
> Source: Burns, O'Connor, and Stocklmayer (2003, p. 199)

Introduction

Science plays a pivotal role in the everyday lives of citizens across societies (Marincola, 2006). As the engine of societal prosperity (DiChristina, 2014), science fuels economic growth and shapes societal advancement through informed engagement of its citizens (DiChristina, 2014; Marincola, 2006). Influenced by science, people make a multitude of simple, complex, individual, and societal decisions ranging from what groceries to purchase, when to see a doctor, to whether to support a new policy on fracking. Hence, civic leaders have taken notice of the central role that science can play in the development of local, national, and international policies (Bultitude et al., 2012). Involving scientists in policy work as consultants, members of advisory and policy committees, and key decision makers has been suggested as an effective approach to back policy with strong scientific evidence (Bultitude et al., 2012). Consequently, evidence-based policymaking—advancement of policy strongly influenced by scientific knowledge—has taken root in public administrations across the globe (Bultitude et al., 2012; e.g., Frenk, 2006; Sanderson, 2002). This encouraging trend of incorporating science in everyday decision-making of citizens and policymakers renders proper communication and dissemination of scientific evidence of great societal import.

As a result of science's increased impact on societies, the past four decades have brought significant growth in science communication practice and research (Burns et al., 2003). Defined as the use of appropriate skills, media, activities, and dialogue to produce public engagement with science, science communication is intended to heighten the public's scientific awareness, understanding, literacy, and culture (Burns et al., 2003). Simply stated, science communication affords individuals the ability and opportunity to "emerge with an interest in science, a confidence to talk about it, and willingness to engage with science wherever and whenever it crosses

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their paths" (Osborne, 1999, para. 7). Society's engagement with, and understanding of, science facilitates a more informed public and better decision-making among the general public.

For science to continue to play an important role in society and influence individual and policy decision-making, its representation in the media, as a public information communication and dissemination system, is important (Jamieson, 2018). Although, in general, the public confidence in the scientific community has remained stable for decades, significant public divides on scientific issues (e.g., climate change) have emerged (Funk & Kennedy, 2019). While the disconnect between scientific and public consensus on science topics, such as climate change, vaccine safety, and evolution, has existed for years, increased political polarization and proliferation of information sharing methods via social media platforms have exacerbated the discrepancy (Scheufele & Krause, 2019). Not bound by the constraints of journalistic integrity and traditional media's pledge to truth, credibility, and the avoidance of contradiction, social media is uniquely situated to deliver unverified and false information (Paul & Matthews, 2016). Untruths are frequently circulated via social media platforms by ideologically polarized communities attempting to influence public opinion (Wardle, 2017). Potential financial gains also drive individuals or groups to employ sophisticated disinformation campaigns targeting public opinion (Wardle, 2017). Once introduced through social media platforms, false unverified information can spread quickly (Vosoughi et al., 2018) and unintentionally by a misinformed public through social media shares, retweets, clicks, etc. (Allcott & Gentzkow, 2017; Bakir & McStay, 2018; Wardle, 2017). The combination of higher exposure to falsified news and lower exposure to verified journalism leads to perceptions that false news is real (Balmas, 2014). As a result, false news has become a global concern putting societies, institutions, and individuals at risk for manipulation (Lazer et al., 2018).

An environment filled with informational uncertainty and doubt presents a real threat to effective science communication, as the science shared with policymakers and individuals can be perceived as false or manipulated for the advancement of ideological or financial gains. A current manifestation of this threat to adopting verified scientific evidence can be observed with the recent coronavirus outbreak. As false information about the coronavirus virally transmits across social networks (Kucharski, 2016), so does the distrust in scientific information shared by experts to save lives and intended to lower the incidence of the viral spread (Fleming, 2020). Some of the motivation behind the false news spread is financial, intended to produce clicks that lead to advertisement-laden content (Fleming, 2020). Some of it is ideologically driven, such as the suggestion that the coronavirus was intentionally created to be used as a bioweapon (Fleming, 2020). Yet, some of the spread is unintentional, produced by a deceived public or simply due to a knowledge gap between what is true and what is not (Fleming, 2020).

No matter the cause, this issue has become so grave that the World Health Organization has described the spread of false coronavirus information as a "massive infodemic" (Fleming, 2020, para. 1). Relying on false information, rather than scientific evidence, has led people to believe that drinking bleach (Frenkel et al., 2020), eating sea lettuce, or injecting disinfectant would protect them from the coronavirus disease or that holding one's breath for 10 seconds would be an effective test

of whether one has contracted the virus (Fleming, 2020). Contrary to false information circulated over social media platforms, smelling sesame and other plant oils, cleaning the nostrils with salty water, or breathing in steam does not kill the virus (Fleming, 2020). False news spreading conspiracy theories about the coronavirus has led people to misplace their anger at 5G towers as the perceived means of viral spread (Nakashima, 2020) or even dismiss the existence of the virus altogether, suggesting it is nothing more than an elaborate hoax (Slessor, 2020). Consequently, the viral spread of false information in general, and on the coronavirus in particular, is threatening to marginalize the importance of scientific evidence, thus limiting the impact of science communication. In this case, the spread of false information has prompted individuals to disengage from following guidelines advanced by scientists that would slow the spread of the virus. If science is indeed the engine of societal prosperity (DiChristina, 2014), then false information could be perceived as the threat to societal progress. Therefore, the question that emerges is how can the spread of false information be mitigated?

Mayorga and colleagues (2020) suggested that no single approach can be effective in mitigating the effects of false news, but, rather, it may take multiple approaches (e.g., information literacy campaigns, automatic detection tools, trained and transparent gatekeepers, accountability procedures for false information perpetrators, etc.) used in tandem to lessen its effect. These approaches could be psychological or mechanical (e.g., automatic detection tools). Psychological approaches, in particular, are well suited to combat the dangers of confirmation bias—the pursuit or interpretation of evidence in support of existing beliefs or hypotheses (Mayorga et al., 2020)—and science denial (Lewandowsky & Oberauer, 2016). According to Ståhl and van Prooijen's research (2017), for a psychological approach to be effective, it needs to arm an individual with both the motivation and sufficient analytical skill to seek counter-belief information for the purpose of belief-updating. Without such practice, scientific evidence disseminated via science communication is in danger of not reaching the public and policymakers, thus impeding the engine of progress (DiChristina, 2014). Mayorga and colleagues (2020) have offered a potential strategy based on the workings of inoculation theory that is well suited to arm individuals with both motivation and sufficient analytical skills to aid against the spread of false news. Having shown initial success in the defense of science communication against the influence of false information (e.g., Cook et al., 2017; Roozenbeek & van der Linden, 2019; van der Linden et al., 2017), this chapter will focus on the potential impact that strategies based on the workings of inoculation theory could have in the effort to mitigate the effects of false information targeting science communication in general, and the coronavirus outbreak in particular.

The chapter will open with a general description of inoculation theory, its operational mechanisms, and overall past efficacy. The discussion will then focus on the success of inoculation messages applied to topics central to science communication. The focus will then turn to the potential impact of inoculation-based strategies in alleviating the individual and societal effects of false information on the novel coronavirus. Before concluding the chapter, inoculation's potential to counter resistance to coronavirus mitigating strategies and influence public opinion and action will be discussed.

Overview of Inoculation Theory

Nearly 60 years of theoretical propositions and empirical findings have established inoculation as the most notable theory in guiding the intentional elicitation of resistance to influence (Banas & Rains, 2010; Compton, 2013; Ivanov, 2017). The mechanisms responsible for this elicitation, according to the theory's originator McGuire (1964), are *threat* and *counterarguing*. Threat is the motivational catalyst that initiates the process of inoculation by introducing a "shock value" (McGuire, 1961, p. 185) to the individual as a warning of the vulnerability of a currently held position (belief, opinion, value, attitude, intention, behavior, etc.; henceforth referred to as *attitude*). The realization of attitudinal vulnerability then motivates the individual to engage in the process of counterarguing to defend the current attitudinal position (Compton & Pfau, 2005; McGuire, 1964). As such, in the process of inoculation, threat motivates counterarguing, which in turn enhances attitudinal resistance.

The process of inoculation can be initiated by rendering individuals to an inoculation message (Compton, 2013; Ivanov, 2017). An inoculation message typically incorporates two primary components, *forewarning* and *refutational preemption*. The forewarning component of the message is designed to explicitly and unambiguously deliver the threat by directly cautioning the message recipients of the high likelihood of facing counterattitudinal challenges and the potency of these challenges (Compton, 2013; Compton & Pfau, 2005; Ivanov, 2017). The refutational preemption component of the message initially introduces weakened examples of potential counterattitudinal challenges, thus rendering the threat real (Compton, 2013; Compton & Pfau, 2005; Ivanov, 2017). Analogous to biomedical inoculations, the counterattitudinal challenges are designed to be strong enough to stimulate a response (defense motivation) but not so strong as to overwhelm the very attitude intended to protect (Compton, 2013; Compton & Pfau, 2005; Ivanov, 2017).

Following the presentation of the weakened counterattitudinal challenges, the refutational preemption component of the message delivers strong refutations to the exemplified challenges (Compton, 2013; Ivanov, 2017). Overall, an inoculation message arms individuals with motivation, some material, and a guided practice on how to counter forthcoming challenges. As such, inoculation messages are well suited to deliver both motivation (explicitly via the forewarning and implicitly via the presentation of the weakened counterattitudinal arguments) and sufficient analytical skills (via the refutational preemption content and guided practice) to contest the spread of false information (Ståhl & van Prooijen, 2017). Yet, for an inoculation-based strategic approach to truly assist in the defense of science communication, it needs to overcome two potential obstacles: content and context.

Content

Inoculation messages are limited in the number of counterattitudinal arguments they can refute. For practical purposes, most inoculation messages refute no more than three potential counterattitudinal arguments in their design (Ivanov, 2012). Therefore, should the effectiveness of the message strategy be limited to only refuted counterarguments, then the efficacy of this approach would be rather

limited as strategists may not be able to anticipate, and comprise response to, every potential argument that may be presented against the inoculation message-advocated position (Compton & Pfau, 2005). However, Compton and Pfau suggested that inoculation may create an umbrella or blanket of protection against all potential challenges presented within an issue domain (2005). Banas and Rains' meta-analysis of 54 cases testing the efficacy of inoculation theory has indeed shown inoculation to be an equally effective strategy in protecting attitudes against both new and previously refuted counterattitudinal challenges (Banas & Rains, 2010). Parker and colleagues (2012) went a step further by suggesting a possibility of cross-protection where inoculation can benefit not only treated attitudes but also attitudes closely related to the treated ones. Early findings have shown promise of cross-protection efficacy (Ivanov et al., 2016; Parker et al., 2012, 2016). Taken together, the above findings show a clear potential for inoculation to aid in the defense of science communication.

Context

Inoculation has been regarded as the "most consistent and reliable method for conferring *resistance* to persuasion" (Miller et al., 2013, p. 127, italics added for emphasis). This statement suggests a contextual boundary for inoculation where the efficacy of the theory is limited to preemption, that is, attitude maintenance, rather than attitude formation or change. Since its origination, inoculation theory has been closely bound to its biomedical namesake, as Ivanov and colleagues have argued that the use of the biomedical analogy is "not merely stylistic," but also "explanatory" (Ivanov et al., 2015, p. 220). As such, inoculation has been traditionally applied as a prophylactic measure to prevent attitude change (Compton & Pfau, 2005). However, the increased focus on therapeutic inoculations in biomedicine has provided a theoretical justification, and perhaps necessity, for inoculation theory to venture outside of its original boundaries (Compton, 2019). Submitting inoculation to empirical testing beyond the context of resistance has demonstrated its effectiveness not only as a prophylactic, but also as a therapeutic, tool (Ivanov et al., 2017; Wood, 2007). Stated differently, inoculation messages have been shown to not only protect favorable attitudes from forthcoming challenges, but, also, to shift neutral and unfavorable attitudes in the direction consistent with the inoculation message (Ivanov et al., 2017). Consequently, inoculation-based strategies can be useful in aiding the defense of science communication regardless of audience members' attitudinal position.

Application of Inoculation Theory

Due to its strategic potential, inoculation theory has garnered significant application interest spanning numerous contexts (Compton, 2013; Ivanov, 2017). As Ivanov has suggested (2017), inoculation-based strategies are applicable to any context in which motivation can be elicited to change, create, or protect an attitude. The following discussion is intended to provide a summary of the general contextual areas in which inoculation has ventured, followed up by an account of inoculation studies related to

the use and protection of science communication. Finally, the discussion will center on the potential for inoculation to be used as a strategic tool to aid against the spread of the novel coronavirus.

The organization and presentation of the contexts and studies in this section is not intended as an exhaustive summary of all the work that has been conducted on inoculation theory in the presented contexts, but rather as an inspiration of possibilities that could be pursued in the given contexts. In addition, the contextual organization presented in this section is by no means intended to be definitive or exhaustive, as individual studies could potentially fit well in multiple discussed and omitted contexts.

Inoculation in General Contexts

While the exploration of inoculation-based strategies has crossed many different contexts, the majority of the produced scholarship could be situated in four general contexts: civic and legal communication, health communication, commercial communication, and public relations (Compton, 2013; Ivanov et al., 2020). Within the context of civic and legal communication, for example, scholars have shown the potential of inoculation to deflect political attacks by opposition candidates; promote confidence in public agencies' response to acts of politically motivated violence; preserve support of desired government policies; and boost expert's credibility in jury trials (Ivanov et al., 2020).

Within the context of health communication, inoculation has been successfully applied as a strategy to mitigate engagement in risky, undesirable, or unhealthy behaviors (Compton, 2013; Compton & Pfau, 2005; Ivanov, 2012, 2017; Pfau, 1995). For example, inoculation has shown efficacy in protecting positive attitudes toward condom use; protecting negative attitudes toward smoking and binge drinking; lowering tanning beds use intention; and boosting exercise enjoyment (Ivanov et al., 2020).

In addition to health communication, inoculation has found considerable application success in the context of commercial communication (Ivanov et al., 2020). For example, inoculation-based strategies have shown the ability to protect images of brands, tourist destinations, and foreign manufacturing sites; customer pre-purchase choices and satisfaction ratings; college students from aggressive credit card marketing efforts; and investors from prematurely divesting stocks in a substantial market downturn (Ivanov et al., 2020).

Public relations represents the fourth major contextual area of inoculation that has received significant scholarly interest (Compton, 2013). For example, empirical findings suggest that inoculation is a capable strategy to protect pro-organizational and value-in-diversity attitudes, as well as boost employee organizational identity, citizenship, and commitment (Ivanov et al., 2020).

In addition to applying inoculation in the four general contexts previously discussed, inoculation-based strategies have found success in other contexts as well, such as educational/instructional communication, cross-cultural communication, and interpersonal communication (Ivanov et al., 2020). Of most interest to the discussion in this chapter is the application of inoculation with topics related to science communication. The next section presents a sample of inoculation studies particularly relevant to science communication.

Inoculation in Science Communication

In nearly 60 years of sustained empirical testing, inoculation theory has been strategically used to defend and/or bolster a wide variety of issues (Banas & Rains, 2010; Compton, 2013; Compton & Pfau, 2005; Ivanov, 2017). Some of these issues are considered to have significant societal import as they impact long-term sustainability of communities not only locally, but across the globe. Issues such as animal research and testing, water conservation, breastfeeding, climate change, and vaccination have direct consequences on the ability of societies to secure renewable water and energy resources and create healthy environments in which residents can thrive and prosper. Yet, false information and conspiracy theories used to seed doubt in the veracity of scientific findings on these important issues present clear threats to evidence-based proposed solutions. In search for effective tools to counter these threats, scholars have tested the efficacy of inoculation-based strategies on the aforementioned issues.

In her exploration of the inoculative effect of evocative visuals, Nabi (2003) applied inoculation in the context of animal research. More specifically, Nabi explored the potential of inoculation to protect the attitude toward the use of animals in medical experimentation against the perception of inhumanity of animal research and researcher callousness. Her results were encouraging, as inoculation proved to be a capable strategy in protecting public opinion favorable to animal testing.

Kemp and colleagues (2012) explored the possibility of using inoculation-based strategies to combat the fierce public resistance to using recycled water in an attempt to elicit community acceptance of recycled water use practices. The results showed limited inoculation efficacy in this product category but did demonstrate scholarly intent to test inoculation-based strategies with topics of great scientific importance.

Nataoli (2015) applied inoculation in the context of breastfeeding. She suggested that lack of knowledge and widespread misinformation about breastfeeding provide barriers to meeting healthy goals, as mothers are vulnerable to both messages that challenge their decisions to breastfeed and messages that apply pressure to switch to formula. While she did not report significant post-intervention differences between the inoculation and control conditions on intention to breastfeed, Nataoli did report high self-efficacy on the part of the study participants to resist giving their babies milk formula. Nataoli attributed the lack of significant differences between the conditions to ceiling effects in the socio-demographic group used in the study. Nevertheless, this study shows another attempt in which inoculation-based strategies were applied to counter scientific misinformation.

In addition to conclusive scientific results being publicly contested on topics such as animal testing, the safety of recycled water, and breastfeeding, the topic of human-caused climate change has received significant public and scientific community attention as ideological polarization and disinformation campaigns threaten to undermine the reality of human-caused climate change (van der Linden et al., 2017). Even though the climate scientific community has reached near consensus proposing that climate change is happening and largely affected by human action (Cook et al., 2016), disinformation campaigns are designed to seed doubt that such consensus exists, instead suggesting lack of scientific clarity and agreement on this issue. As a result, van der Linden and colleagues (2017) tested the efficacy of inoculation messages to debunk the notion that the climate scientific community has not reached consensus on the topic. Their

findings indicated that not only does inoculation present an effective strategic approach to combat such disinformation campaigns, but its effect was equivalent across the political spectrum.

Cook and colleagues (2017) also focused their attention on the topic of human-caused climate change by attempting to use inoculation to expose different misleading techniques used by climate change deniers (Mayorga et al., 2020). In their efforts, they concentrated their attention on the usage of fake experts and fake balance to counter the evidence and consensus offered by scientists. Fake experts are considered those who do not have the correct credentials to render proper judgment on the issue (Mayorga et al., 2020). Fake balance refers to the allotment of equal space and time for arguments on both sides of the issue, thus giving the impression that the opinions on the issues are indeed divided and the science unsettled, despite the overwhelming consensus advocating the opposite (Mayorga et al., 2020). The results of their study showed that the inoculation messages were not only capable of neutralizing the effects of fake balance and fake experts but also neutralized the polarizing effect across the political spectrum on the issue of human-caused climate change (Cook et al., 2017). The findings from both climate change studies (i.e., Cook et al., 2017; van der Linden et al., 2017) provide converging evidence of the efficacy of inoculation-based strategies in protecting the public from false information targeting the scientific consensus on human-caused climate change.

Another issue of significant scientific import is the public debate over the safety and efficacy of vaccinations as traumatic anecdotal evidence and news stories threaten to erode positive sentiment toward the practice of vaccinations (Wong, 2016), particularly when children are involved. In the effort to uncover an effective approach to augment anti-vaccination sentiment, scholars have turned to inoculation-based strategies (Jolley & Douglas, 2017; Park, 2015; Wong, 2016; Wong & Harrison, 2014). Park (2015) explored the efficacy of different inoculation approaches to protect the positive sentiment toward flu vaccination from misperception of potential side effects. The results of Park's (2015) study showed promising potential for inoculation messages to act as barriers to infectious disease misinformation.

Wong (2016) tested two different inoculation messages as a means to combat attacks targeting the safety and efficacy of the human papilloma virus (HPV) vaccine. The first inoculation message was specifically designed to protect positive HPV vaccination attitudes against attacks. The second inoculation message was designed to protect general vaccination attitudes against attacks directed at the safety and efficacy of vaccination practices. The results of the study showed both approaches to be equally effective in protecting pro-HPV vaccination attitudes. Wong's findings are especially significant because they show the ability of a single inoculation message to target a wider infectious disease spectrum of anti-vaccination challenges.

Wong and Harrison (2014) discovered inoculated individuals to not only indicate greater intent to receive the HPV vaccine, but also greater intent to have their children vaccinated against the HPV as well. These results are consistent with the discovery of Jolley and Douglas (2017) who found inoculation messages to be able to undermine the efficacy of anti-vaccination conspiracy theories aimed at keeping parents from vaccinating their children. Jolley and Douglas' findings also suggested that once anti-vaccination conspiracy theories take root, they are difficult to correct. As such, they recommended prophylactic usage of inoculation-based strategies to blunt the impact of impending conspiracy theories.

Overall, the application of inoculation-based strategies in the defense and bolstering of scientifically supported positions on issues of significant societal import has shown early promise. Still, it may be premature to draw definitive conclusions on the bases of single studies exploring the efficacy of inoculation on specific issues such as animal testing, water conservation, or breastfeeding. On the other hand, the convergence of scientific evidence drawn from multi-study explorations regarding inoculation's efficacy on issues, such as climate change and vaccination, provides greater confidence in the ability of inoculation to offer a viable alternative strategic solution in support of scientific evidence. Of particular interest in this chapter is the consolidated evidence showing inoculation's potential to protect the public from false information on infectious diseases. As such, the next section explores the potential role inoculation-based strategies can undertake in the battle against the novel coronavirus.

Inoculation and the Coronavirus

The coronavirus presents a major societal threat as it continues to endanger the health and economic prosperity of countries across the world (Cutler, 2020). The global economic downturn has had substantial negative consequences on businesses as unemployment has continued to rise, despite government efforts to ease the economic suffering (Cutler, 2020). According to Cutler, a Harvard University professor of applied economics, "the economy will not regain its footing until the health crisis is addressed" (2020, para. 8). Yet, effectively addressing the health crisis has proven to be a challenge with the number of coronavirus cases continuing to rise (Soucheray, 2020). Spontaneous and coordinated misinformation campaigns (Fleming, 2020) and conspiracy theories (Nakashima, 2020; Slessor, 2020) have undermined the recommendations of the scientific community on how to best overcome the present crisis. As suggested in this chapter, inoculation messages are designed to arm individuals with motivation and efficacy—sufficient analytic skill to seek counter-belief information for the purpose of belief-updating—both of which are crucial tools in the effort to counter false information (Stahl & van Prooijen, 2017) and influence public opinion and action (Mayorga et al., 2020). Thus, this section will explore the potential of inoculation to be used as a strategic communication tool to counter false coronavirus information, conspiracy theories, anti-vaccination sentiment, and public resistance to coronavirus mitigating strategies. The section will conclude by discussing the strategic potential of using inoculation-based messages to influence public opinion and behavior.

Countering False Information

Individual and coordinated false information campaigns across the globe have resulted in public confusion with some individuals believing that drinking bleach, eating sea lettuce, self-injecting disinfectant, smelling sesame and other plant oils, cleaning the nostrils with salty water, or breathing in steam could neutralize the coronavirus (Fleming, 2020). The results of this confusion have not been innocuous with an American woman being admitted to the hospital and her husband dying of cardiac arrest after consuming chloroquine phosphate due to a misinformed belief that the substance would prevent the coronavirus (Neuman, 2020). Similarly, *Covid-Organics*, an herbal remedy, has been widely distributed across the African continent as a coronavirus remedy, despite the lack of evidence substantiating its efficacy (Baker, 2020).

In their desire to find protection from the coronavirus, many individuals seem to be grasping for any hope presented while ignoring scientific evidence that may stand in the way of their perceived safety. Further, the unsubstantiated claims are perpetuated by individuals who do not vet the accuracy or sources of information they are reading. While the scientific evidence may be unsettling, it is intended to correct and prevent the spread of false information and, in the process, save lives. As such, the effective diffusion of evidence-based information to counter the unintentional and coordinated spread of false information is of significant societal consequence. Inoculation messages offer the potential to effectively counter scientifically refuted false information (Mayorga et al., 2020). Just as inoculation messages displayed efficacy in neutralizing climate change misinformation (Cook et al., 2017; van der Linden et al., 2017), this message-strategy may hold similar promise in challenging the spread of false coronavirus information.

Countering Conspiracy Theories

The rampant diffusion of conspiracy theories regarding the coronavirus' existence (Slessor, 2020), origin (Fleming, 2020), and spread (Nakashima, 2020) has produced anger, distrust, and dismissal of scientific evidence intended to help ease the present health crisis. Conspiracy theories are generally advanced because they "provide psychological comfort for believers by assigning clear responsibility for unpleasant, complex events beyond their control" (Banas & Miller, 2013, p. 184). They tend to fuel extremism and undermine public confidence in democratic institutions (Banas & Miller, 2013). Consequently, conspiracy theories impede the spread and adoption of essential evidence-supported recommendations, which in the case of the coronavirus are intended to ease the crisis and save lives.

As a possible antidote to conspiracy theories, Banas and Miller (2013) proposed inoculation as a strategic tool with potential ability to curtail conspiracy theory thinking. In their experiment, Banas and Miller explored the efficacy of fact-based (i.e., specific refutation of some of the factual claims made by the conspiracy theorist) and logic-based (i.e., refutation of the reasoning process behind conspiracy theories) inoculation messages to generate resistance to conspiracy theories. While both approaches were effective, fact-based treatments proved to be superior in protecting individual attitudes against the impact of conspiracy theories. It is important to note from their study that the conspiracy theory was delivered as a sustained 40-minute video attack rather than as limited few-sentence arguments. Yet, even with such a robust attack, the inoculation treatments demonstrated efficacy, thus establishing inoculation-based strategies as viable communication approaches capable of countering the effects of conspiracy theories, such as those suggesting that the coronavirus is a hoax (Slessor, 2020), a bioweapon (Fleming, 2020), or a product of 5G cell tower transmission (Nakashima, 2020).

Countering Anti-vaccination Sentiment

Banas and Miller's (2013) study results are consistent with the previously discussed findings of Jolley and Douglas (2017) who discovered inoculation messages to be effective in fending off child anti-vaccination conspiracy theories aimed at perceived negative side-effects of vaccination practices. Jolley and Douglas's (2017) findings in concert with the previously discussed findings on the efficacy of inoculation in protecting and

bolstering pro-vaccination attitudes in adults and children (Park, 2015; Wong, 2016; Wong & Harrison, 2014) offer an important strategic message solution for how to counter negative sentiment toward a future coronavirus vaccine.

With a possible coronavirus vaccine becoming available as early as the end of the 2020 year (Brading, 2020), the present danger seems to stem from a large portion of the public rejecting the efficacy and safety of the forthcoming vaccine. Presently, only 50% of Americans have indicated intent to receive the vaccine (Cornwall, 2020). With well-known celebrities, such as top-ranked tennis player Novak Djokovic, openly opposing coronavirus vaccination (Conway, 2020), there is a clear danger of populations not being able to establish herd immunity. As epidemiologists estimate, breaking the epidemic may depend on populations reaching 70% immunity (Cornwall, 2020). Thus, breaking the epidemic would necessitate increasing public sentiment toward wider acceptance of coronavirus vaccinations. Yet, "traditional messages promoting vaccinations ... just don't cut it with people worrying about vaccine safety" (Cornwall, 2020, para. 13). Inoculation-based messages, on the other hand, have shown consistent efficacy in their ability to influence public sentiment on vaccination practices (Jolley & Douglas, 2017; Park, 2015; Wong, 2016; Wong & Harrison, 2014) and, as such, they are well-suited to assist the efforts of civic leaders to convince the public to accept the forthcoming coronavirus vaccine.

Countering Resistance to Coronavirus Mitigating Strategies

In the absence of a coronavirus vaccine, experts have agreed that the best way to mitigate the spread of the virus is through facial coverings and physical distancing (Chu et al., 2020). Yet, a significant proportion of the population has continued to oppose the advice of experts and civic leaders. Some of the resistance is simply due to false information (e.g., masks cause re-breathing of own carbon-dioxide; Burling, 2020). Some of the resistance to wearing facial coverings is because of conflicting messages disseminated by civic leaders, which undermines their credibility (Gillespie, 2020). Some of the resistance is due to the denial of the severity or even the existence of the coronavirus threat (Gillespie, 2020). Yet, much of the resistance is centered on the perceived loss of decision control (Buchwald, 2020; Gillespie, 2020). As individuals perceive their freedom to choose being infringed upon by others—leaders or peers—they take a stand against such requests in solidarity with one another (Buchwald, 2020). Even when facial coverings and physical distancing are mandated, many individuals choose to defy these mandates suggesting such requests impede on their constitutionally guaranteed freedom of choice (Buchwald, 2020).

Inoculation messages could be used to counter the resistance to the coronavirus mitigating strategies of wearing face coverings and observing physical distancing. As previously discussed, inoculation-based strategies have shown efficacy in neutralizing the effect of false information (Mayorga et al., 2020). As such, inoculation messages should be able to counter the effects of misguided beliefs, such as the view that masks are dangerous because they lead to inhalation of carbon dioxide (Burling, 2020). The more pertinent question, however, is whether inoculation-based approaches can have an effect on individuals rejecting the coronavirus mitigating strategies in defense of their freedom of choice.

Before answering the above question, it is important to note that contemporary inoculation scholars design their messages to avoid threatening the independence of

message receivers to choose a course of action (Ivanov, 2017). In the closing message statements, inoculation scholars remind individuals of the evidence provided in the message to help aid their decisions but also of the freedom that individuals have to select their own courses of action. However, while inoculation messages may be carefully constructed not to impede the perceived freedom of choice for message recipients, the perceived threat to independent choice may be external to the inoculation message and contained in the coronavirus mitigating strategies (e.g., mandated physical distancing). As such, can inoculation messages overcome the psychological reactance—motivation to restore the perceived loss of choice freedom (Miller et al., 2013)—attributed to the coronavirus mitigating strategies?

A study by Richards and Banas (2014) showed that inoculation messages can decrease psychological reactance against health campaigns and facilitate message acceptance. By forewarning individuals of the psychological reactance that the health campaign may elicit, the inoculation message was successful in increasing the health campaign efficacy by tempering psychological reactance. This study shows the potential of inoculation messages to be used in a similar capacity to counter psychological reactance generated by the perceived restriction of freedom brought upon by the request or mandate for individuals to psychically distance and wear face coverings.

Influencing Public Opinion and Behavior

A health crisis, such as the coronavirus outbreak, can have a negative impact on the economy (Cutler, 2020). During a crisis, shelter-in-place mandates imposed by leaders and increases in infection rates lead to a workforce reduction. This outcome has an impact on the production and distribution of goods, which leads to food and supply shortages. Such shortages inspire people to engage in stockpiling of provisions for individual use or resale, which may not only be unnecessary, but unethical as well (Ahlberg, 2020). Stockpiling can aggravate economic disadvantages that some people already experience (i.e., those who cannot afford to stockpile), exacerbate social injustice, and turn people against one another (Ahlberg, 2020). In the process, excessive shoppers can transform from community members to potential obstacles for neighbor survival, thus undermining the possibility for social cooperation and the conditions for a just society (Ahlberg, 2020). To prevent such actions, civic leaders have urged shoppers to refrain from stockpiling supplies and thus exacerbating the problem (Orner, 2020).

While gaining public compliance to prevent stockpiling has been a focal issue during the coronavirus outbreak, leaders have struggled with gaining public and organizational compliance on a number of other issues, such as price gauging, avoidance of large gatherings, and unnecessary travel. Yet, the public diversity of opinion and action makes devising an effective communication message strategy a challenge as the message would need to simultaneously strengthen desirable opinions and actions and change undesirable ones. For example, the message strategy would need to reassure the members of the public who have refrained from stockpiling to continue to do so even as they observe store supplies diminishing. Simultaneously, the message strategy would need to convince the members of the stockpiling public to cease the practice. Inoculation messages have shown efficacy in doing both, bolstering and protecting desirable current attitudes and changing undesirable attitudes. For example, Ivanov and colleagues (2017) successfully used inoculation messages to

simultaneously protect positive attitudes toward selected tourist destinations and attenuate negative attitudes toward the same destinations. Similarly, inoculation messages can be used to refute the necessity of a stockpiling practice and reassure the public of the availability of resources in absence of such a practice, thus reinforcing the positive attitudes and behaviors of those refraining from the practice and correcting those of the stockpiling public.

Overall, inoculation-based message strategies have demonstrated greater efficacy compared to conventional message strategies in simultaneously creating, protecting, and changing attitudes (Ivanov et al., 2017; Wood, 2007). As such, they offer a promising message approach that leaders can rely on to influence public opinion and behavior on issues of societal importance in a time of crisis such as the coronavirus outbreak.

Conclusion

Science is essential to societal progress as it contributes to informed decision-making on the part of its citizens and civic leaders and a knowledgeable public that can properly vet information (Bultitude et al., 2012; DiChristina, 2014). As such, effective science communication ensures proper dissemination of evidence and research intended to bolster the public's scientific awareness, understanding, literacy, and culture (Burns et al., 2003). Yet, the increase in ideological polarization and proliferation of information sharing methods using social media platforms have widened the gap between scientific and public consensus on science-related issues (Scheufele & Krause, 2019). This divide has had significant negative consequences in the attempt of civic leaders to mitigate the effects of the current coronavirus outbreak by gaining public compliance with proposed recommendations and mandates. Having observed the continued increase in the number of coronavirus infections in the commonwealth of Kentucky, Dr. Steven Stack, commissioner of the Kentucky Department for Public Health, recently suggested:

> This is not outside of our control. Our actions can have a positive impact. One point I want to emphasize is that it's not politics if you have President Trump [Republican] and Governor Beshear [Democrat] making the same recommendations. It's not politics. This is *science*. If we work together through this, we can succeed.
>
> *(Kentucky.gov, 2020, para. 8, italics added for emphasis)*

The challenge faced by civic leaders and decision makers is in how to properly communicate and defend science, while gaining compliance with potentially life-saving science-based recommendations and mandates. This chapter discussed the efficacy of inoculation messages to simultaneously act as defenders of science and facilitators of science-based policies. As such, it proposed the use of inoculation-based strategies as potential means to influence public opinion and behavior and counter false information, conspiracy theories, anti-vaccination sentiment, and resistance to coronavirus mitigating strategies.

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Part 4

Examining Policy and Leadership

14

Communicating with Policymakers in a Pandemic

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Introduction

In 90 years, our progeny will likely view a 2020 image of someone illuminated by the glow of a smartphone, browsing social media for novel coronavirus SARS-CoV-2 (COVID-19) health updates and its concomitant economic consequences, in the same way we now view a 1930s family huddled around a radio listening to a Great Depression era fire-side chat—as quaint and simple. But today's world of information, communication, and technology seems anything but quaint and simple. Information spews Hydra-like from varied devices and in multiple formats, begging for a Herculean-like effort to tame and understand it. And like Hydra, the nine-headed serpent from Greek mythology that spread terror while being impervious to mortal control, the current public health landscape is filled with alarming messages about risks posed by COVID-19 and uncertain approaches to contain its contagion.

While the accessibility of technology has made it easier to craft and deliver a message, this accessibility has simultaneously created an informational fog that obscures and softens it. Indeed, buffeted by waves of information that wash over us each day, some have argued that we suffer from a collective attention deficit disorder. It is becoming harder to absorb, process, and contextualize news and information. And wrestling with robust belief systems is as much of a problem today as it was in the nineteenth century when American humorist Artemus Ward wrote, "It ain't so much the things we don't know that get us into trouble, it's the things we do know that just ain't so."

The interconnected nature of the global economic system along with the ease of international travel has made the world smaller and thus helped facilitate an era of increased risks, both seemingly in their frequency as well as in their potential for harm. While these trends have created tremendous economic opportunities and an unprecedented abundance of goods and services, they have also exposed us to many potential hazards that lie beyond our regulatory control. Imported food laced with illegal pesticides and banned antibiotics, counterfeit medicines that are labeled and packaged to look like the real thing, toys coated with lead paint or produced with cancer-causing chemicals, and the potential to spread a global pandemic with rapid travel to and from far-flung corners of the globe have raised the stakes in risk communication. Since the reach of these hazards can extend to any community—rich or poor,

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urban or rural, and large or small—it is essential that all communities prepare for low-probability, high-impact risks.

Scientific and policy experts face obstacles in getting citizens, leaders, and policymakers to receive and embrace messages about risks and how to respond to them. In our hyper-politicized climate, for example, where everything from donning a face mask to following social distancing guidelines is often viewed through a political lens, some will seize upon the inherent uncertainty of the scientific method and suffuse it with political intentions. Nonetheless, as public health experts and others endeavor to flatten the curve, and eventually eradicate the coronavirus, the strength of analysis, cogency of message, and form of delivery will determine the success in informing, educating, and influencing policymakers and the public.

The Numbers

The COVID-19 pandemic is arguably the most significant test of the US health system in more than a century. With over 7.6 million confirmed cases in the United States and over 213,000 deaths, COVID-19 has levied a significant cost (Centers for Disease Control, 2020). Like many diseases, this one is not distributed evenly across demographic groups: older adults, racial and ethnic minorities, and low- to middle-income groups have experienced significantly higher death rates than other populations. Meanwhile, COVID-19 is working its way up the list of leading causes of death in the United States. The top 10 causes of death are shown in Figure 14.1, with heart disease and cancer accounting for most deaths. The COVID-19 bar, showing 213,037 deaths, reflects less than nine months of data, from January 21, 2020 to October 10, 2020, while the numbers for the other causes of death reflect annual totals.

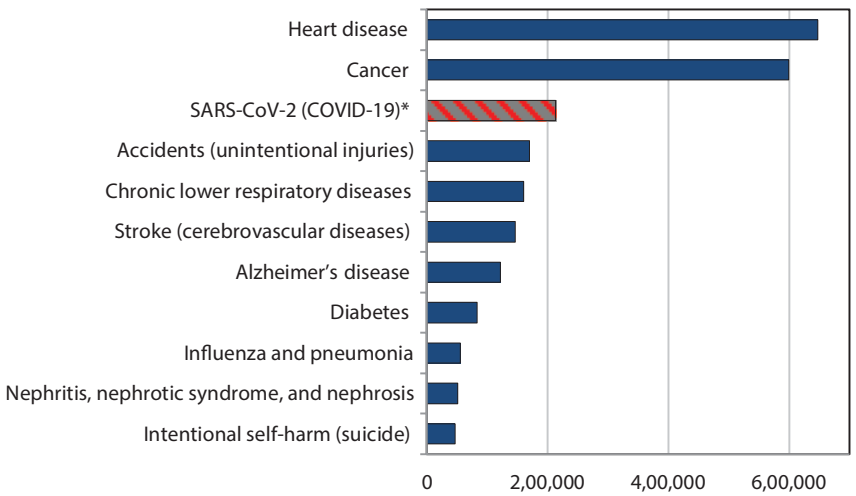

Figure 14.1 COVID-19 deaths and leading causes of death, 2017. (COVID-19 deaths January 21, 2020 to October 10, 2020). *Source: Mortality in the United States* by Xu et al. (2018); CDC (2020).

The COVID-19 observed case-fatality ratio is 3.7% in the United States, which is a death rate of 43 per 100,000 population (Figure 14.2) (Johns Hopkins University & Medicine, 2020). When compared to the other 36 Organisation for Economic Co-operation and Development (OECD) countries, the United States has the eighth highest death rate. By comparison, Sweden, which has allowed businesses to remain open during the pandemic, has a death rate of 55 per 100,000 and ranks fifth on the list. Canada, on the other hand, which, of course, shares a 5,500-mile border with the United States, has a death rate of 24 per 100,000 population and comes in at twelfth highest. But even some survivors will continue to suffer lingering degradation of respiratory, circulatory, and renal function long after the onset of the disease. Consequently, this disease could join the group of chronic conditions contributing to the nation's disability rate, which robs roughly 10% of the population between the ages of 18 and 64 years of the ability to live and work without a serious physical, emotional, or mental limitation.

The health consequences of the pandemic come with a hefty economic price tag. It is not surprising then that an estimated 86% of the US adult population follow national news about the economic impact of the COVID-19 outbreak either very closely (46%) or somewhat closely (40%) (Pew Research Center's American News Pathways data tool, 2020c).

From July 2009 through February 2020, the United States experienced its longest economic expansion in history. Over this period, employers added an average of two million jobs per year for a total of 21 million new jobs. In February, the expansion ended abruptly as the spread of COVID-19 in the United States prompted the shut-down of many businesses to slow infection rates.

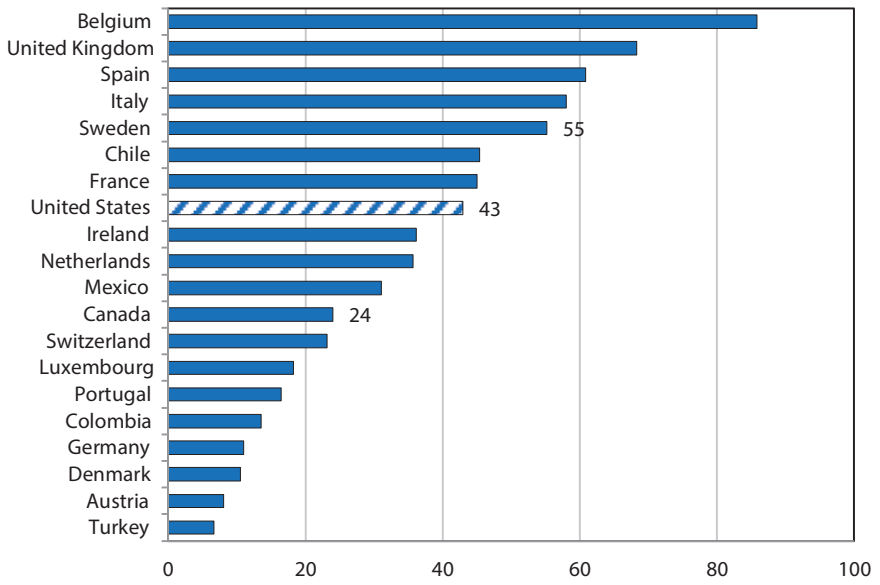

Figure 14.2 COVID-19 death rates in OECD countries. (deaths per 100,000 population, top 20 countries). *Source:* Adapted from Johns Hopkins University & Medicine (2020, July 19).

The economic damage was both sudden and severe (Figure 14.3). From February to April, nonfarm employment decreased by 22 million jobs. In two months, the United States lost more jobs than it added over the past 10 years. By contrast, during the Great Recession, employment declined by 8.7 million jobs in total, but these losses were spread over a 2-year period.

Some workers have returned to their jobs as states lifted restrictions and businesses reopened. As of June, the US economy had recovered one-third of lost jobs. However, uncertainty with the progression of the virus and containment policies make the recovery tenuous.

All major industrial sectors lost employment. Even healthcare employers, which normally continue to add workers during recessions, reduced payrolls by 10% from February to April as non-essential medical procedures were postponed in order to conserve personal protective equipment. Employment losses were most severe for leisure and hospitality businesses, which cut their payrolls by half (Figure 14.4).

Employment in retail trade was down by 15% in April, but certain types of retailers were hit harder than others (Figure 14.5). Clothing stores reduced payrolls by 62% in April and were still down 40% in June. Employment in grocery stores and home and garden stores increased slightly.

The recession has widened inequality as minorities and workers with less education have borne a disproportionate share of the job losses. Employment rates are generally low among individuals with less education even in normal times. In January, 43% of the US population with less than a high school education was employed, which is much lower than the 72% for those with a college education. The recession has widened this difference (Figure 14.6). The employment to population ratio decreased by 7.7 percentage points for those with less than a high school education; 7.9% for those with a high school education but no college; and 4.6 percentage points for those with a college education. Workers with more education are more likely to be in jobs that can

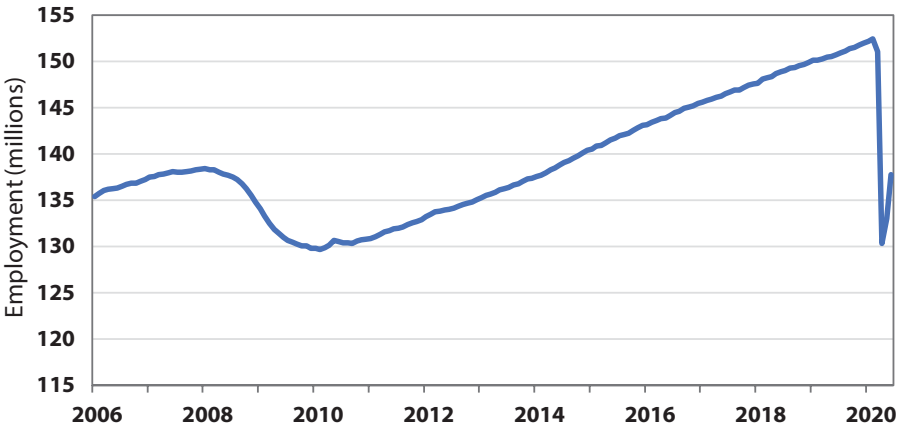

Figure 14.3 US nonfarm employment (millions). *Source:* Adapted from Current Employment Statistics Highlights, US Bureau of Labor Statistics (2020).

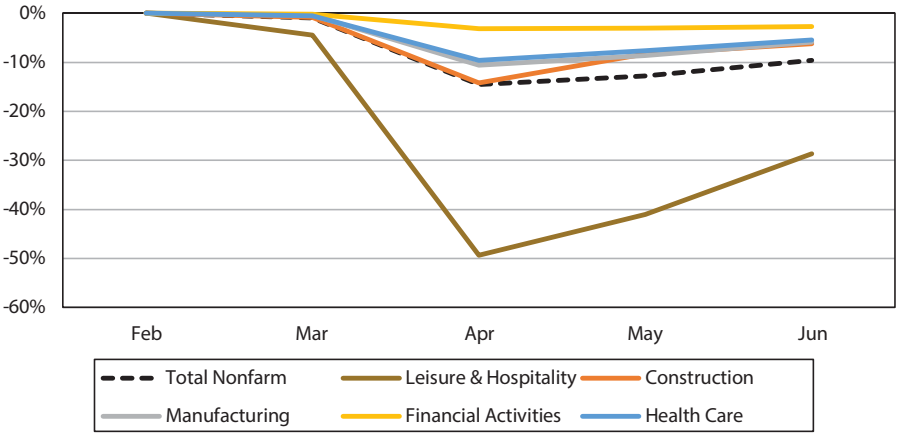

Figure 14.4 Change in US employment (percent change since February 2020). *Source:* Based on Current Employment Statistics, US Bureau of Labor Statistics (2020).

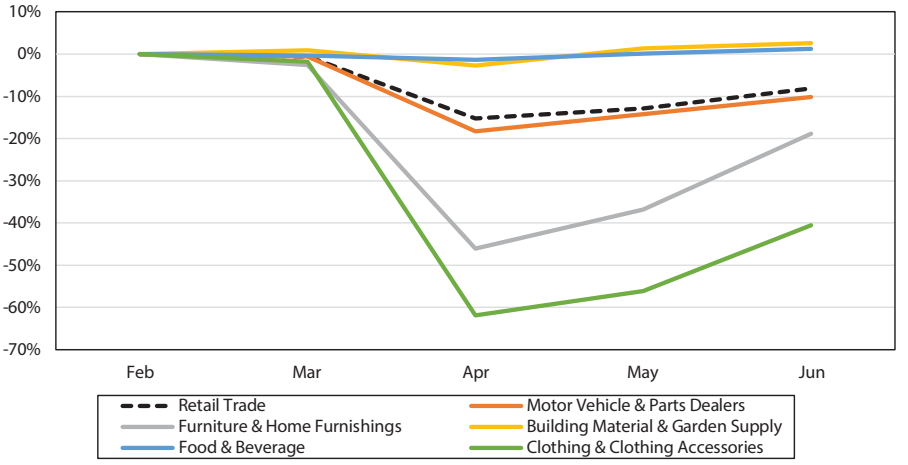

Figure 14.5 Change in retail trade employment (percent change since February 2020). *Source:* Based on Current Employment Statistics, US Bureau of Labor Statistics (2020).

be performed remotely, which has contributed to more stable employment for these workers during the pandemic.

The pandemic has also widened the employment gap between whites and blacks (Figure 14.7). When the Great Recession ended, 61% of the nation's white population were employed compared to 55% of the nation's black population—a six percentage point difference. This gap narrowed over the next 10 years. In February 2020, approximately 59% of blacks were employed, just two percentage

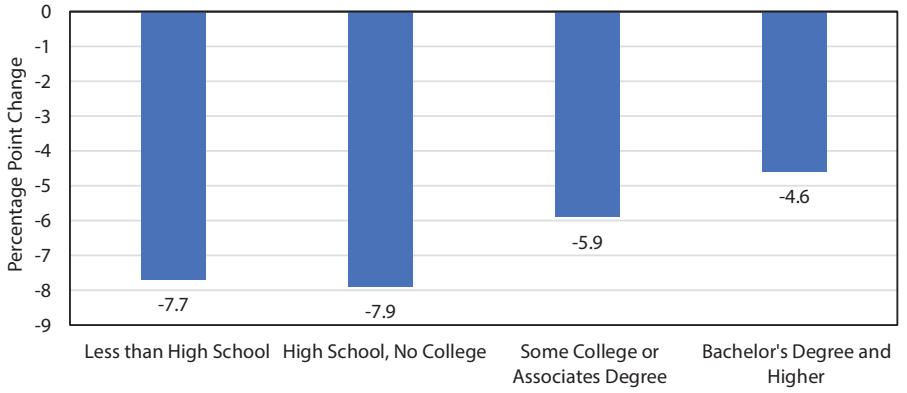

Figure 14.6 Change in US employment to population ratio from January 2020 to June 2020. *Note: Ages 25 years and over. Source:* Based on Current Employment Statistics, US Bureau of Labor Statistics (2020).

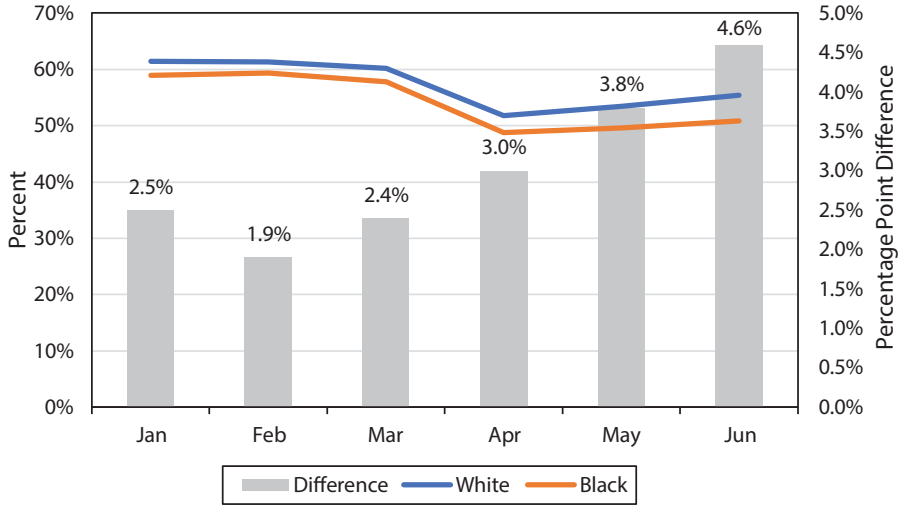

Figure 14.7 US employment to population ratio. (2020). *Note: Ages 16 years and over. Source:* Based on Current Employment Statistics, US Bureau of Labor Statistics (2020).

points less than whites. However, blacks were more likely to work in sectors affected by the coronavirus and more likely to lose their jobs. By June, only 51% of blacks were employed, increasing the gap between whites and blacks to 4.6 percentage points.

The bottom line is clear: the pandemic and our response to it have significantly affected the economy, and the conventional wisdom among economists seems to be that the economic impact will be felt for years. Ensuring that the best science and

information on navigating through the pandemic is communicated to policymakers in an effective manner—so that it will be noticed and considered—is essential.

Information Ecosystem

Clearly, the health, social, educational, and economic consequences of this pandemic represent one of the most significant challenges our country has ever faced. Yet, given the maelstrom of information that flies around us each day, it is becoming harder to focus on any particular message as the daily news cycle is supplanted by a continuous stream of updates on the civil unrest, the pandemic, or its economic consequences, just to name a few. While quantity of information can be *over*whelming, the quality of information is often *under*whelming. The amount of misinformation on social media, as well as the perceived bias in the traditional media, has resulted in only 13% of Americans trusting the media "a great deal," and 28% "a fair amount," with notable differences in opinion demonstrated by political party identification (Gallup, 2020).

As we try to navigate through this informational fog, the queuing of delivery trucks outside the Library of Congress is indicative of the amount of information produced daily; *each working day*, the Library receives some 15,000 items and adds more than 10,000 items to its collections (Library of Congress, 2020). As the base of knowledge shifts like a sand dune, the mind-numbing pace of change makes the present feel like Toffler's *Future Shock* has come to fruition.

While we are being buried in paper, we are being bombarded with digital debris. Using the untethered information delivery device, previously known as the telephone, can be like drinking from a fire hose as one absorbs a multitude of Twitter tweets, e-mail messages, and Facebook updates. Facebook had 1.73 billion daily active users, on average, for March 2020, an increase of 11% year-over-year (Facebook, 2020). Even without a Facebook account, the average household has enough screens in their households (e.g., televisions, computers, tablets, etc.) and access to content on the cloud to stay occupied for years. And despite having the ability to avoid advertisements by using the remote control's fast-forward buttons, or the financial wherewithal to stream online content without ads, the market research firm, Yankelovich, estimates that a person living in a city sees up to 5,000 ad messages a day on TV, newspapers, billboards, or some other form (Story, 2007).

And policymakers are not immune to the unrelenting barrage of informational artillery arising from the battlefield of ideas. There were, for example, over 13,000 bills and resolutions introduced during the 116th Congress, and thousands more each year in state capitals across the country. Whipsawed by the issue *du jour*, it is easy to lose focus on what is most important for the long-term future of our country. All of this information has its benefits, but with a cost—to quote Sam Anderson in a May 2009 *New York* Magazine article, "a wealth of information creates a poverty of attention."

For many individuals who *do* pay attention, they express skepticism about the COVID-19 information coming from the political leaders and the news media. An increasing share of Americans, led by Republicans, believe the outbreak has been overblown (Pew Research Center, 2020a). The percentage of US adults who say the coronavirus outbreak has been made **a bigger deal than it really is** has increased from 29% in April 2020 to 38% in June 2020. Among Republicans, the percentage

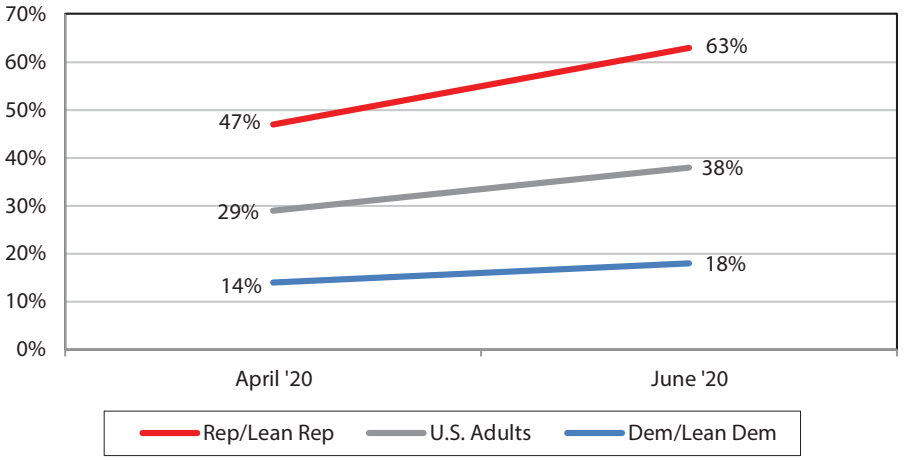

Figure 14.8 Americans who say the coronavirus outbreak has been made a bigger deal than it really is (percent of adults). *Source:* Modified from Pew Research Center (2020b).

increased from 47 to 63, and among Democrats, it increased from 14 to 18%. The difference between Democrats and Republicans reflects how COVID-19 has become politicized and is indicative of the communication difficulties faced by those trying to retain a nonpartisan posture when communicating with policymakers about the pandemic (see Figure 14.8).

Policymaking Process

One's perspective on how policy is made affects one's assumptions about how best to communicate with those making the policies. Our vision of the policymaking process is more in line with the "successive limited comparisons" formulation described in Charles Lindblom's classic article, "The Science of Muddling Through" (Lindblom, 1959), than the rational-comprehensive approach advanced as the ideal process in public administration textbooks.

Perhaps a less radical idea now compared to 60 years ago, Lindblom downplayed the importance of deliberative and systematic policy analysis, pointing out that the entire endeavor is fraught with vagueness and imprecision. And, in his view, policymakers are likely to eschew initiatives that lie outside the boundary of political feasibility. Consequently, new policy initiatives are generally incremental extensions of existing policies since they tend to enjoy some degree of acceptance among policymakers and the public.

This contrasts sharply with the rational-comprehensive approach, which assumes that policymakers have nearly perfect information about community values and objectives, that there are options available that somehow reflect an ideal synthesis of these values and preferences, and that a range of outcomes or options can be generated from which the "best" policy option can be selected. The assumptions that undergird this framework, such as near certainty about outcomes, begin to waver in times of crisis, especially during a pandemic.

Inherent to our perspective of the policymaking process is that communication with policymakers and the public has to be clear, succinct, and compelling—otherwise, it is likely to go unnoticed or be viewed with skepticism. We see three parts of the policymaking process that are germane to this discussion: analytic, communication, and uptake. The analytic portion of the process consists of the data collection and analysis. The communication part includes the presentation of *what* was done in the analytic stage and *how* the information is conveyed. The uptake part—getting policymakers and the public to do something with the information that is being presented—is the most difficult part of the process to achieve.

Three Obstacles

We see three main obstacles to the policy process described above: uncertainty, information overload, and politics. These obstacles are most pronounced at different stages of the process, as illustrated in Table 14.1. In the sections below, we discuss each of these obstacles and use contemporary examples of artful communication to the public and policymakers.

Uncertainty

The reality is that analysis is rarely perfect or sufficiently precise. The responsibility of the analyst is to be as rigorous, analytical, empirical, and precise as possible—while resisting the temptation to be *overly* precise. When uncertain about point estimates, it is perfectly acceptable to use bounded estimates (i.e., ranges) or alternative scenarios. Just like a journalist, the analyst's most valuable asset is *credibility*. And intellectual honesty is the *sine qua non* of credibility. It is therefore essential that the analyst does not stray beyond the boundaries of the analysis or results. Adopting a conservative posture toward results and conclusions enhances the credibility of the analysis. Becoming comfortable with uncertainty does not necessarily come easy, but if one lists caveats, for example, it is an act of intellectual rigor and honesty that enhances credibility—which increases the probability that the policymakers will view the work seriously.

Columbia University researchers published a study in May that uses **bounded estimates** to illustrate the benefits of acting quickly to contain the spread of the virus—and by implication, they show the costs of delay (Sen Pei, 2020). Social distancing orders began in mid-March, and by May 3, there were a reported 65,300 deaths

Table 14.1 The process and the obstacle.

		Process		
		Analytic	**Communication**	**Uptake**
Obstacles	Uncertainty	✓		
	Information Overload		✓	
	Politics			✓

attributed to COVID-19. These researchers estimated that had the social distancing orders been implemented one week earlier, i.e., March 8 instead of March 15, there would have been 54% fewer deaths by May 3—almost half the number of deaths. This, of course, represents a point estimate, but the researchers also published a range, from 43.6% to 63.8%, which represents the 95% confidence interval. The larger point of these model-based estimates is evident: acting quickly can save thousands of lives.

Another recent study found that state imposed social distancing orders significantly reduced the rate of COVID-19 infections (Courtemanche, 2020). Charles Courtemanche et al. used a technique of **alternative scenarios** to communicate varying options to policymakers. The study, "Strong Social Distancing Measures in the United States Reduced The COVID-19 Growth Rate," examines four approaches used by state and local governments to dampen the growth rate of confirmed COVID-19 cases: large event bans; school closures, closures of entertainment venues, such as gyms, bars, and restaurant dining areas; and shelter-in-place orders (SIPOs). The results illustrate the efficacy of SIPOs relative to the other approaches; they find that the spread of the disease would have been 10 times greater without SIPOs (10 million cases), and more than 35 times greater without any of the four measures (35 million). Their analysis illustrates for policymakers, and communicates very clearly, the relative effectiveness of the four strategies in limiting the growth rate of COVID-19 confirmed cases.

Information Overload

There is a lot of competition for audience attention, but there are many ways to avoid what is known as the Olympic Diver Syndrome, which is a policy report that looks great and makes no splash. Providing a clear organizing structure that helps the policymaker categorize ideas and points is essential. One should always remember that "less is more." Getting to the point quickly will help keep their interest. One should remember what young journalists are taught, "don't bury the lead" and keep policy options and recommendations to a minimum—three to five instead of a comprehensive list of potential actions.

Given the amount of information clutter, it will likely be necessary to ensure a policymaker is provided with the key information several times, in several different formats. Letting the "rule of seven" guide one's approach—an old marketing axiom that a customer has to see a brand at least seven times before it makes a strong enough impression that they will buy the product—has relevance in the marketplace of ideas. Moreover, using different conduits or forms of messaging, is equally useful (e.g., a hard copy report, direct email, and Twitter and other social media platforms).

Most policymakers are not trained as economists, social scientists, or statisticians, so one should always write for a lay audience but include technical appendices for the technical staff. Finally, the presentation matters. Successful chefs, for example, understand the power of presentation, or plating. The appearance of a hardcopy report will go a long way in determining whether the policymaker gives a policy report more than a casual glance. A smartly designed cover has a better chance of being read than one with a drab, grayscale, text-laden cover.

Policymakers not only have to slog through waves of information, they frequently find themselves waist-deep in *mis*information. Illustrative of this is a consistent narrative emanating from some media outlets that the number of pandemic deaths is inflated for political purposes. The assertion has been made that COVID-19 is freely

listed on death certificates when other underlying health issues are just as likely to have been the cause of death.

Anticipating misinformation and **actively addressing it** can dampen its impact on the policymaking process. Using the concept of "excess deaths," for instance, allows one to illustrate that beginning in late March, the death rate increased to higher-than-normal levels—and *something* had to cause it. Excess deaths are the number of observed deaths above the number of expected deaths during a specific time period. The Centers for Disease Control and Prevention (CDC) estimates that from February 1, 2020, to September 26, 2020, there were between 221,120 and 294,124 excess deaths in the United States (Figure 14.9) (Centers for Disease Control and Prevention, 2020). In the figure, the bars that extend above the line—which is the average expected number of weekly deaths—are clearly visible, beginning in mid-March and peaking in mid-April.

While misinformation is problematic, the volume of information aimed at policymakers presents a more formidable challenge when vying for attention. With regard to health security preparedness, there are two ongoing initiatives that synthesize a lot of information and boil it down to a simple message by using an **index** that ranks or categorizes states based on their level of readiness: The *National Health Security Preparedness Index* and the *Trust for America's Health Ready or Not* reports.

A group of seven economists were asked what has been learned from the pandemic that can be applied in the next crisis, and in their view, preparedness is fundamentally important (Norwood, 2020). *Ready or Not: Protecting the Public's Health from Diseases, Disasters and Bioterrorism* is an annual report measuring states' level of preparedness to protect the public's health during an emergency. Based on 10 performance indicators, the report ranks states' level of preparedness into three performance tiers: high, middle, and low (Trust for America's Health, 2020). A related initiative, the *National Health Security Preparedness Index* (i.e., the Index), combines 130 measures from

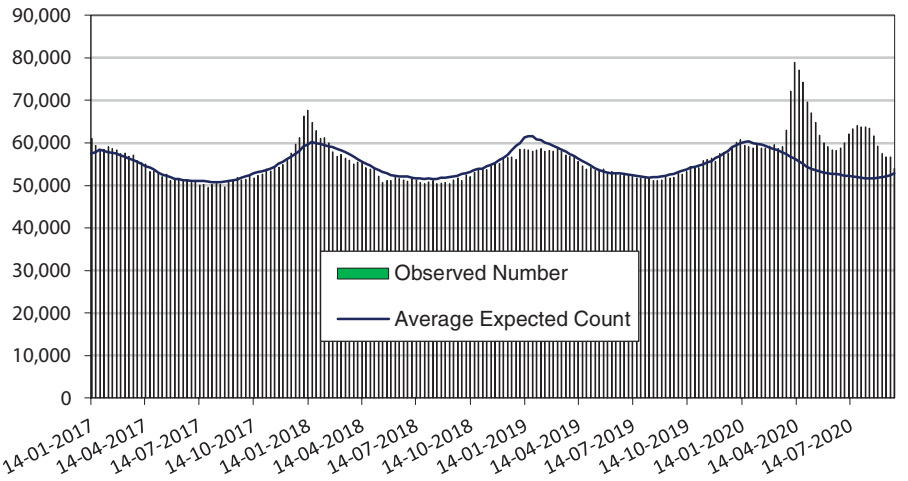

Figure 14.9 Weekly number of deaths, from all causes. (Week ending January 14, 2017 to September 26, 2020). *Source:* Centers for Disease Control and Prevention (2020, July 20).

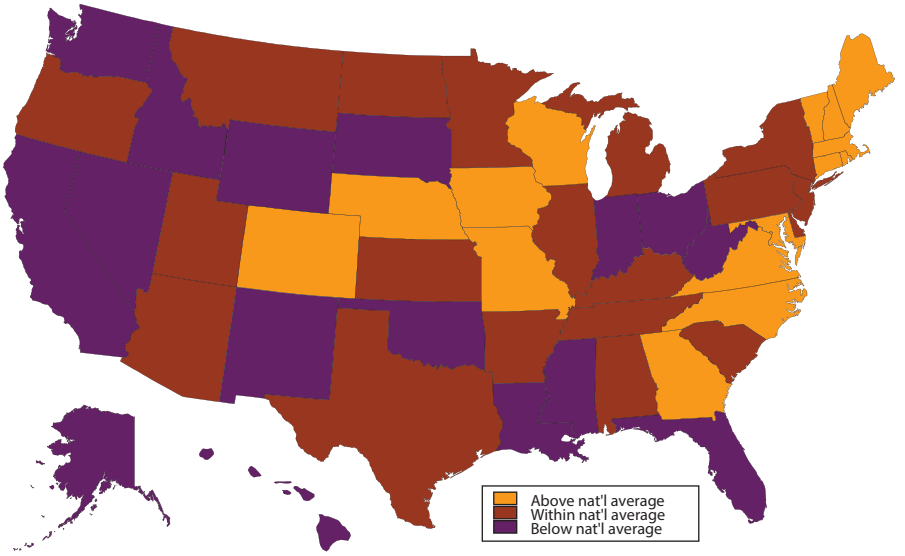

Figure 14.10 National health security preparedness index, 2020 release. *Source:* Based on The National Health Security Preparedness Index 2020 Release, National Health Security Preparedness (2020).

multiple sources and perspectives to offer a broad view of the health protections in place for the nation as a whole and for each US state (Mays et al., 2020). The index identifies strengths as well as gaps in the protections needed to keep people safe and healthy in the face of large-scale public health threats, and it tracks how these protections vary across the United States and change over time.

Since every state is placed on a 10-point scale of preparedness, the index can be used by policymakers to quickly see where their state stands relative to the nation and nearby states (Figure 14.10), and hopefully respond accordingly. By digging a little deeper, policymakers can see how their state performs in six broad areas or domains of health security, with each of these also placed on a 10-point scale: health security surveillance; community planning and engagement; information and incident management; healthcare delivery; countermeasure management; and environmental and occupational health. Finally, this annual report presents several specific variables or measures that are relevant to the COVID-19 pandemic, like public health lab testing capabilities, healthcare preparedness coalition participation, medical staff surge capacity, nursing home infection control performance, and household broadband adoption, to name a few.

Politics

Good politics beats good policy nearly every time—making it a difficult, but not impossible task, to successfully communicate with policymakers. Timing is everything, so keeping the conversation going on a policy issue—until the political context is ripe for it—can be considered a success. For the less patient, there are other ways to move through a political minefield without losing a limb: be empirical, not ideological; avoid advocating; and build coalitions.

Because policymakers often see a trade-off between good politics and good policy, showing them a route through this dilemma can lead to successful communication. In the COVID-19 context, good policy would have entailed large investments in public resources before the pandemic into areas that bolster public health preparedness. On the other hand, to the extent this would have required either additional revenue (e.g., increased taxes) or changes in the existing budgetary apportionment (e.g., budgetary cutbacks in other areas), it would have been, in many cases, an exercise in "bad politics." Likewise, social distancing measures, such as closing businesses and limiting large gatherings, involve a trade-off between public health and economic activity. Helping policymakers understand the exact nature of these **trade-offs**, by clearly elucidating the competing pressures and assigning them a value, can provide policymakers with a route forward that facilitates good policy.

Jim Ziliak, Professor of Economics at the University of Kentucky, compared recent economic losses likely created from these social distancing measures to the value of lives potentially saved (Patel et al., 2020). He cited estimates that gross domestic product, which measures the value of goods and services produced by the US economy, declined by $1.5–$2.5 trillion due to the outbreak. Much of these losses were due to social distancing measures that were sometimes adopted voluntarily by businesses and other organizations and sometimes mandated by state and local governments. While these losses were significant, as Ziliak points out, they should be compared to what is gained from the social distancing measures to determine whether they benefit or harm society.

As noted earlier, the Courtemanche study found that state-imposed social distancing orders significantly reduced the rate of COVID-19 infections (Courtemanche, 2020). By lowering infection rates, states that imposed social distancing also likely reduced mortality rates. The lives saved have value, and economists estimate this value by examining the trade-offs people make between risk of fatality and money (Kniesner & Viscusi, 2019). For example, workers typically require greater compensation for jobs that expose them to greater risk of death. Current estimates suggest the value of a statistical life in the United States is approximately $10 million. These estimates allow economists to compare the value of lost economic activity to the value of lives saved from social distancing orders.

Ziliak estimated that the total value of lives saved from reduced infections could range from $420 billion to $20.3 trillion depending on the assumptions regarding fatality rates and the value of a statistical life. While there is considerable uncertainty associated with these estimates, they suggest the benefits that social distancing orders provide to society could significantly exceed the lost economic activity.

While this analysis does not provide a complete accounting of the costs and benefits created by social distancing measures, it does illustrate the important and complicated trade-offs that policymakers must grapple with as they evaluate alternative policies to address the crisis. And, by using a framework that compares the costs of these approaches, policymakers are provided with a path to advance good policy.

Whether to wear a face mask is perhaps the best illustration of the collision between COVID-19 politics and policy. Early in the pandemic, the message from public health officials was that healthy people should not be wearing a face mask. Given the shortage of masks, officials wanted them reserved for healthcare workers and at-risk individuals. Also, infection control experts were uncertain about how the virus was

transmitted, raising doubts over the efficacy of face masks in stopping the virus. And, until recently—mid-July—the president has been very clear about his feelings on face masks: they aren't for him. This is despite the fact that in early April the CDC changed course and urged all Americans to wear a mask when they leave their homes.

Good public health policy encourages the use of masks, but partisan politics entered into the mix, perhaps inadvertently, explaining the party divide on whether one uses a mask in public. A Pew Research poll in early June asked whether, in the last month, one had worn a mask or face covering when in stores or other businesses—while 76% of Democrats answered yes, only 53% of Republicans said yes (Pew Research Center, 2020b). But public health officials have been steady in their messaging: wear a face mask to protect yourself and others because they work to stymie the spread of COVID-19. The consistency of the message since early April, **keeping the conversation going**, despite the political pushback, appears to have been effective in gradually softening the opposition to face masks.

Conclusion

Policymakers can be viewed as rational actors, even if they don't always embrace the rational-comprehensive approach to policymaking. Arguably, on average, a policymaker's incentive structure is framed mainly by a relatively short-term election cycle, rather than a long-term policy cycle. This incentive structure, along with formidable obstacles like uncertainty and information overload, make it difficult to effectively communicate with policymakers. However, precise analysis, that is presented succinctly, can help shift the political calculus toward the embrace of good policy.

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15

Equally Unpleasant Choices

Observations on School Leadership in a Time of Crisis

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Definition of *Between the devil and the deep blue sea*—an English idiom used to express an impossible dilemma. To find oneself between the devil and the deep blue sea is to be faced with a series of equally unpleasant choices. Synonym: *Between a rock and a hard place* (Collins English Dictionary, 2020).

Introduction

As August 2020 and the traditional return to school approached, the nerves of school leaders frayed. For many superintendents and principals, their school reopening plans were perhaps the hardest call of their careers. By comparison, the seemingly difficult choice to cancel school for a snow day now seemed trivial. Every school leader knew, no matter the choice, large factions of the community would be unhappy. Every choice was equally unpleasant.

With no winning choice in sight, the reserves of good will—generated in the spring by rapidly adapting to emergency remote schooling and deploying a massive food service campaign—faded over the course of the long, exhausting months of the summer of 2020 as COVID-19 infection rates surged across the United States. Yet, as each day passed, school reopening decisions drew nearer. A plan had to be decided and communicated. Families needed to know; businesses wanted to know; and government officials demanded to know. There was no easy way out; it was the devil or the deep blue sea.

This chapter provides an examination of the months between March, when schools began to close, and September, when they began to reopen, of the year 2020 amidst the worst pandemic in a century. First, the context faced by school leaders is examined with an overview of both the scientific and political contexts in which school leaders were faced with communicating decisions. Second, the common responses from schools to facilitate communication are examined through three common steps: surveying of families, developing and deploying reopening playbooks, and communicating through new digital media. Third, while the pandemic is still active and situations are still changing daily, the chapter provides some initial insight into broader challenges and unexpected silver linings that are emerging.

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The Context: Between the Rocks and the Hard Places

For school leaders, the difficulties in 2020 piled up quickly. The traditional sources of guidance began the year in alignment as schools were initially closed across much of the United States in response to rising cases across several states. However, as the weeks passed, frustrations grew, and messages began to conflict. The end of the school year offered a brief respite and a hope that the early months of summer would resolve the crisis. The summer, though, offered only more questions and fewer clear answers. The following section documents some of the challenges facing school leaders during this period.

Conflicting Scientific Conclusions

As school leaders began to tackle the development and eventual communication of reopening plans in earnest in early May, a series of difficult tensions weighed on the decisions that lay ahead. Common sense dictated they should follow the science, but that proved to be easier said than done. In the case of COVID-19, the science was anything but easy to follow. The epidemiological evidence being tracked and reported by the scientific community was emerging in real time, but key scientific agencies often disagreed about how best to respond to the evidence. Mixed scientific messages emerged as to whether kids were unlikely to get the virus, whether masks should be mandatory, how long the virus lived in the air and on hard surfaces, and many more. Further complicating the ability to follow the science was the prevalence of incomplete and even conflicting information about the number of cases and positivity rates by region, county, or school district.

The Centers for Disease Control (CDC), long the gold standard organization for such challenges, released guidance in July aimed at *Preparing K12 School Administrators for a Safe Return to School in Fall 2020* (Centers for Disease Control, 2020a). In addition to the expected mitigation and prevention strategies, this guidance highlighted the important communication roles to be played by school administrators if schools were to be reopened successfully. Educators were to "engage and encourage everyone in the school and the community to practice preventive behaviors." Further, they must "communicate, educate, and reinforce appropriate hygiene and social distancing practices in ways that are developmentally appropriate for students, teachers, and staff." Yet, despite the emphasis of the CDC guidance document on the importance of returning to school in person, they admit that "There is mixed evidence about whether returning to school results in increased transmission or outbreaks" (para. 15), citing contrasting studies from Denmark and Israel.

Similarly, the American Academy of Pediatrics (AAP) devoted significant space on its website to issues related to COVID-19 and children. Most alarmingly, on August 10, 2020, the AAP posted a news release (AAP, 2020a) citing a report by the AAP and the Children's Hospital Association that compiled state-by-state data indicating that, between July 9 and August 6, 2020, there were 179,990 new child cases—an increase of 90% in child cases over a 4-week period. The news brief went on to "underscore the urgent need to control the virus in communities so schools may reopen" (para. 1).

This "urgent need to control the virus" language appears to be an about face by the AAP who had released an earlier news brief (AAP, 2020b) on June 25, 2020, in which they stressed that the goal should be returning to in-person classes. In that document, "the AAP strongly advocates that all policy considerations for the coming school year should start with a goal of having students physically present in school" (p. 1).

Such reversals were to be expected in light of the data being reported in real time, but they illuminate the difficulty school administrators faced throughout the summer as they tried to act in a decisive and timely way regarding the reopening of schools. What seemed like a wise course of action one week might be entirely out of the question the next. The traditional date for starting the new school year was colliding perilously with the apex of cases in many states.

Through it all, superintendents found themselves out of their area of expertise as they faced what was at its essence a public health crisis, not an educational one. Even when they attempted to follow the science and collaborated closely with their public health counterparts, they were faced with decisions that they simply could not make in good faith on their own. Many leaders expressed the frustration they experienced in this vast and unfamiliar landscape by calling on governmental leaders to make the reopening decisions for them—"just tell us what to do" became the plea. This willingness to abdicate local control was anathema to most district leaders who generally pride themselves on their responsiveness and commitment to the needs of their own communities and families. This desire to get clearer guidance from above mostly aligned with their own desires to do the right thing, scientifically. While school leaders are trained to be good communicators, they were poorly positioned to conduct their own local epidemiological analyses. Unfortunately, the scientific consensus was not arriving quickly enough and the public desire for answers on school reopening plans grew overwhelming, opening the door to political intrusion.

Difficult Internal Tensions

As the science was evolving rapidly with continuing mixed messages over the course of the summer of 2020, public opinion became volatile. Increasingly, the polarization took on the form of a Sophie's choice of reopening schools versus reopening the economy. This added a level of excruciating pressure to the dilemma school leaders faced. While educators bristled at the notion of reopening schools as the gateway to reopening the US economy, that was an undeniable reality, and communities began to take sides along partisan lines.

Laboring under pressure to take care of the children so parents could return to work and thereby reopen the economy, teachers took to social media to protest the premise that their role was akin to that of childcare providers rather than educational providers. Many educators internalized the strife as a lack of appreciation for their work and found themselves at odds with the families they so proudly served. Similarly, many teachers desperately wanted to return in person to their classrooms and their students, but had to face their own fears related to contracting the virus or bringing it home to their families. Immunocompromised school employees and those who were caring for vulnerable family members began pushing school leaders around mid-summer for accommodations and solutions that allowed some teachers to work from home while others returned in person.

Superintendents had to deal with human capital determinations that addressed fairness, clear expectations, safe working conditions, and, most importantly, how to deliver the most effective instruction in a variety of reopening scenarios. In many cases, state-level policy decisions had to be made to provide the level of flexibility and timeliness that educational leaders needed to balance these competing interests. In Kentucky, for instance, the governor's office in conjunction with the Kentucky Board of Education announced an emergency regulation that would allow local boards of education to add unlimited emergency days for use by district employees for COVID-related absences such as being required to quarantine due to exposure (Perkins, 2020). This was one of several emergency regulations needed to pave the way for reopening in the fall of 2020.

Policy action alone was not sufficient to pave the way for school reopening planning. In the event that schools reopened virtually, some superintendents mandated that teachers report to school to teach online because of better internet connectivity and easier supervision. In such cases, in addition to increasing their chance of exposure to other people, teachers often needed to bring their own children to school where they, too, would be learning online. To a very real extent, such mandates, while seemingly logical and more fair, defeated the purpose of reopening virtually. Each reopening scenario was fraught with its own set of polarizing pros and cons leaving superintendents in the classic win-lose scenario with a variety of equally unpleasant choices.

Accounting for Inequities and Abuse

Further exacerbating the impact of extended school closures were very real inequities faced by some students and families who experienced remote learning for the first time in the spring of 2020. Access and opportunity challenges stemmed from a variety of factors. First, a serious lack of device deployment by school districts stranded many students without the needed learning tools. Further, state policy failures created a lack of access to reliable Internet in the home, particularly in rural areas and low-income communities. Even with a device and access, in many cases, working parents and guardians deemed essential workers had to rely on grandparents, neighbors, or older siblings to supervise the learning of younger children during the remote school day. In households with multiple school-aged children, older children often had to manage their own schoolwork during times when their teachers were unavailable to provide synchronous support—evenings and weekends. Some older students also reported the need to pick up part-time employment to supplement lost wages experienced by their parents and guardians resulting in even less structured time to complete their schoolwork.

Some family members, oftentimes mothers trying to work from home and grandparents raising their grandchildren, felt incapable of supporting their children's learning because they lacked the time, the technology skills, or the content skills (or all three) to answer their children's questions about their schoolwork. These challenges were most insurmountable in those households where parents were front-line workers, where family members were ill, where there was no Internet access, and where other ongoing challenges in the home made it nearly impossible for children to accomplish remote learning for extended periods of time.

Among the students most negatively affected by the impact of COVID-19 shutdowns were those students with disabilities who relied heavily during the school year on additional supports including occupational therapy, physical therapy, orientation and mobility, and other wrap-around services, most of which had rarely been provided in remote settings.

Roughly 14% of US students have been identified as students with disabilities ranging from mild to moderate to severe disabilities in various categories, including cognitive and physical disabilities, speech/language deficits, developmental delays, behavioral disorders, and more.

Under typical circumstances, depending on individual needs, schools provide an array of support and therapeutic services, such as mental health counseling. These services are typically provided at the school, but there were very few models of these services being made available in virtual or remote settings by the spring of 2020. Echoing their general child welfare concerns, state and local school officials felt stymied in their ability to provide these essential services to those students who needed them the most. As superintendents experienced mandates and other delays that caused them to push back the start of in-person school, they agonized about the loss of time and learning and the lack of emotional, behavioral, and physical supports their students with disabilities would be able to access—all of which they would otherwise have provided via in-person school.

Additionally, child welfare concerns added to the anguish of school reopening decisions as state-level child services officials around the country reported a serious lull in the reporting of child abuse and neglect cases during the school shut-down period (Collins, 2020). This decline was not, in their official estimation, a result of fewer instances of abuse but rather attributable to the fact that educators, who are responsible for many if not most child abuse reports, had not seen their students in person since March. School leaders were keenly aware that at least some of the children and youth they serve are often safer and better cared for during school than in situations where they might be dealing with various challenges related to homelessness, lack of adult supervision, hunger, abuse, and neglect.

Across all of these equity concerns, school leaders were distraught by the potential learning loss students were experiencing and the disproportionately negative impact this loss, which became known as *COVID slide*, would have on very young children, children with disabilities, and English learners. The potential harm caused by extended time away from school for the most vulnerable children and youth was further highlighted in the CDC (2020b, para. 1) guidance:

> the harms attributed to closed schools on the social, emotional, and behavioral health, economic well-being, and academic achievement of children, in both the short- and long-term, are well-known and significant. Further, the lack of in-person educational options disproportionately harms low-income and minority children and those living with disabilities. These students are far less likely to have access to private instruction and care and far more likely to rely on key school-supported resources like food programs, special education services, counseling, and after-school programs to meet basic developmental needs.

The Secretary-General of the United Nations echoed those concerns when he called the closing of schools a "generational catastrophe" and took action via a policy brief entitled *Save our Future* (United Nations, 2020, p. 1). Secretary-General Guterres wrote in the press release: "We are at a defining moment for the world's children and young people. The decisions that governments and partners take now will have lasting impact on hundreds of millions of young people, and on the development prospects of countries for decades to come" (Guterres, 2020, para. 14).

The Court of Public Opinion

As educational leaders struggled to make sense of the science, balance inequities, and mitigate child welfare concerns, the politics of reopening schools began to dominate the airwaves. On Twitter, the president of the United States was calling regularly for schools to reopen beginning in May and even publicly attacked the CDC guidance calling for distancing and masks as too tough, expensive, and impractical (Sprunt & Turner, 2020). The Secretary of Education threatened to cut federal funding to schools that did not reopen buildings (Cathey, 2020). A Senator introduced legislation to shift public school dollars to private schools (Paul, 2020), which were generally planning to reopen in person because of potential lost tuition revenue.

Governors became involved. In Iowa, for instance, Governor Kim Reynolds issued a July proclamation that at least 50% of all instruction should be in person (Richardson, 2020). On the same day, in California, Governor Gavin Newsom ordered schools in 32 hotspot counties to remain closed (Lambert, 2020). Both decisions resulted in lawsuits, leading to even more uncertainty as court decisions were rendered and appealed. Locally elected officials, mayors and city councils, weighed in with their own opinions. There was so much political intensity around the choice that it seemed everybody had a different opinion, yet all purported to have science and the best interest of kids on their side. The political cacophony rang loudly in the ears of already overwhelmed school administrators.

As summer 2020 waned and the traditional fall opening of school loomed, unease with opening school buildings continued to grow. The National Education Association (Walker, 2020a) issued their own guidance on reopening that advocated more restrictive planning. Some union affiliates, like the Florida Education Association (2020), even filed suit to halt school reopening plans. Superintendents now found themselves at odds with their own employees, weighing child welfare against the health and safety of the adults who were also in their care.

Locally elected school board officials were not immune to political lines being drawn across the nation regarding mask wearing, federal stimulus funds, additional support for the unemployed, and various state-level issues swirling around reopening the economy. School board members found themselves caught between their teachers and staff, who expressed reluctance and even fear about returning to school, and their communities at large who clamored for reopening schools so that they could get back to work. School reopening became the proxy for a return to normal, and the political fight intensified at every level of government. At the local level, where reopening decisions are traditionally made, school board members and superintendents were potentially at odds with one another, and these very real conflicts played out in public meetings, held on video and frequently attended by hundreds, as boards considered their options for reopening schools.

The Response: Scrambling for a New Heading

As June turned to July, reality set in for school officials; they were on their own. While local school boards would make the final decision, school leaders had to inform the choice, develop reopening plans, build virtual schools, and communicate with families. The following section provides examples from around the United States of schools engaging in the process of formulating and executing their reopening plans.

Gathering Data

Amidst all of these tensions and conflicting narratives, school leaders faced the nearly impossible task of communicating a reasonable and safe path forward to their local communities on the specifics of a school reopening plan. To meet this challenge, a series of common steps began to emerge over the course of summer 2020. The first of these steps would be to gather data and, in doing so, buy some time. School districts engaged in deep surveying of their local communities to understand their own specific challenges. These surveys were generally sent to families in late June or early July by districts across the nation.

Milwaukee, Wisconsin released their reopening survey for parents and students on June 30 (Milwaukee Public Schools, 2020a). In the survey, parents, guardians, and students were asked questions about reopening, including open-text response options. The survey articulated a series of reopening scenarios and asked whether parents and students would consider each possibility. Those scenarios included:

- All students in school five days a week.
- All students in school five days a week, with a virtual option.
- All students alternate two days a week in person, virtual the other days.
- All students alternate one week in person, the other week virtual.
- Elementary students in person five days a week; secondary students learning virtually five days a week
- Completely virtual for all students.

Milwaukee Public Schools also asked questions about the safety-related, virus-mitigation protocols to be used in an in-person reopening scenario such as mask wearing, bus capacity, hand washing, temperature checks, social distancing, and the presence of volunteers in the buildings. The survey also probed the potential for families to access additional services such as bussing and after-school programing. Finally, the survey asked about digital access and supports available in the home in the event of virtual learning, including whether the child had access to technology for at-home learning.

In all, over 31,000 students, parents, and teachers responded to the Milwaukee survey (Johnson, 2020). Of the respondents, 46% of parents, 26% of students, and 31% of staff indicated they were not comfortable returning to onsite school. Ultimately, based largely on the result of this feedback, Milwaukee Public Schools (2020b) announced in their *Roadmap to Readiness* on July 14, 2020, that the district would not return to onsite, in-person classes and instead would reopen the school year exclusively virtually.

In addition to family surveys, districts needed to gauge the various perspectives of their employees. School districts are often one of the largest employers in a community, employing a range of personnel including teachers, bus drivers, custodians, food service workers, nurses, clerical staff, instructional assistants, and more. Thus, districts engaged in surveying their staff to understand the challenges and feelings they were experiencing about reopening in person in the fall. In The School District of Philadelphia (2020a), for instance, 12,334 school-based staff took a reopening survey. The survey probed such themes as comfort level with various options, safety and virus-mitigation protocols, and technology access. Similar to Milwaukee, results from staff surveys showed mixed responses with a consistent group of 20–35% of respondents not reporting being comfortable with returning to in-person school.

Philadelphia announced in a school reopening plan in July that classes would start virtually for the first marking period of the year (The School District of Philadelphia, 2020b). While these are two large urban districts for which data are readily available, rural and suburban districts across the country were doing similar surveying of families, students, and staff throughout the summer of 2020 to inform local decision-making.

Broadening the Team

As the survey data returned and the summer drew to a close, school districts experienced increasing pressure from families to formally announce their reopening plans. While state agencies and public health offices were providing guidance documents throughout the summer, ultimately the decision of how to reopen schools in most states was left up to local control, driven primarily by school district leaders with the consent of local boards of education. Each of the reopening plans had layers upon layers of nuance as the many components of operating the school system had to be accounted for as part of the plan. Plans had to consider not only the regular operations of the school day, but transportation to and from school, the safe operation of food service programs, conducting before- and after-school events including the safe return to fall sports, incorporating additional sanitation measures, and so much more.

In addition to the frequent use of stakeholder surveys and availing themselves of a series of just-in-time guidance documents from state agencies, many superintendents in partnership with other community leaders seized on another emergent strategy—the establishment of community-based COVID-19 task forces or advisory teams. Identifying a cross-agency group of community-invested partners allowed school leaders to tap into expertise in their own backyards and proved to be mutually beneficial to all participants. Relying on the members' individual and collective knowledge while applying what they were observing and learning about the virus to their own local contexts helped school leaders develop the collegiality, shared responsibility, and mutual support to make better, more informed decisions. And, perhaps equally as importantly, they helped bear one another's burdens as they presented a unified front to their communities.

In rural Allen County, KY, Superintendent Travis Hamby reached out to local community leaders and partners in March 2020 upon hearing from the Kentucky governor that the pandemic was about to require the closing of schools for an extended period of time. The group included directors of the local health department, emergency

management, the local medical center, their interfaith coalition, and the assisted living facility along with the county judge executive, mayor, and various local healthcare providers. They began with a meeting to discuss the impending crisis and how they would collaborate across community sectors. From there, they began to meet daily at 8:30 am to review state and local coronavirus data including new cases, active cases, recoveries, deaths, and positivity rates, comparing their local situation with that of the whole state.

The group eventually christened themselves the Allen County Scottsville Coronavirus Working Group and began releasing their findings to the community on a daily basis (2020). They also advised one another on how to safely conduct community events like high school graduation and school and community sports leagues, and they reviewed each other's reopening plans. As of early September, the work group had agreed to continue as an inter-agency team throughout the duration of the pandemic. Such local collaboration extended the team surrounding the highly contentious school reopening decision and brought in much needed information and expertise to severely strained school leadership teams.

Developing a Playbook

As school leaders analyzed survey results, studied guidance documents from state and federal government agencies, and consulted regularly with their local partners, they began to address the task of developing and communicating their reopening plans. These plans represented district leaders' best efforts to describe their overall reopening models as well as the layers of complexity and scenarios they would likely experience throughout the reopening effort. Because in most cases the reopening plans had to be approved by a local board of education, school leaders had to package the various components of the reopening plan into a single document that the school board could approve and their stakeholders could understand. These documents became extremely important artifacts designed to help communicate the district's expectations for safely reopening during an active pandemic along with their contingency plans for what to do in the event of a surge in cases in their local schools and communities. After all, it was not just about getting them back in school but about keeping them there as the virus ran its natural course.

To meet these critical communication challenges, many school leaders developed reopening playbooks of various forms and often posted these plans on a COVID-specific webpage on the district website. The playbooks were typically longer documents that addressed a variety of categories, often in great detail, including opening dates and learning modalities, health and safety protocols, sanitation practices, testing protocols, student transportation, digital access for remote learning, supports for special needs populations, and staff guidelines. In many districts, these playbooks were also published in multiple languages.

The Knox County Schools (Knoxville, TN) reopening playbook provides insight into many of the common elements of these communications (2020). Titled *KCS Connect*, the 27-page document begins by articulating a green, yellow, and red model where green denotes normal operating procedures, yellow is on-campus learning with COVID-19 safety protocols, and red calls for virtual/remote learning only. In the introduction, the document announces that Knox County would be reopening in the

yellow model with open buildings and additional safety protocols while also providing an optional virtual academy for families choosing not to send their children to campus in person.

After introducing the color-coded model, the document provides a retrospective by tracing the events of the spring and summer that led to the need for such a document. In particular, the document recounts the variety of ways the district sought feedback throughout that period. In addition to the community survey, which had 32,577 responses, the district provided the names of the participants in teacher, principal, student, parent, and after-school childcare focus groups along with the names of the 9-member taskforce that was asked to provide guidance to the school board on the community needs as part of the reopening.

The next section of the Knox County reopening plan addressed the decision-making steps surrounding the daily consideration of whether to keep school buildings open as the school year progressed. In particular, it provided a 10-step response protocol in the event of a reported case of COVID-19 within a particular school. Those steps included notifying the health department, isolating the student(s) while on campus, additional cleaning procedures, and potentially deciding to close the school.

The Knox County Schools' reopening plan then addressed conditions under which school would reopen and all the new steps required of each school. The additional protocols implicated staff health checks and arrival to the buildings, student arrival and dismissal, bus transportation, visitor access to school, meals at schools, extra-curricular activities, and after school childcare. Also addressed were the district's plans for managing student masks, social distancing, and student temperature checks. A later section provided additional details applying to students from special populations such as students with disabilities, English language learners, and gifted students. After briefly addressing technology issues, the plan detailed the social, emotional, and mental health services that would be made available to students and families

Finally, the Knox County Schools reopening plan addressed their commitments to communication throughout the school year. They stated that:

> ... we are committed to providing transparent and thorough information about all aspects of district operations, both for our in-school students and those using the virtual learning program. Our stakeholders will have many questions about all areas of our work, including safety protocols; academic strategies; device deployment; support for students with special needs; transportation; and other issues. Our communications strategy will seek to be proactive about anticipating the questions and concerns of our stakeholders, in order to provide the information they need before they ask. At the same time, we will establish flexible and responsive procedures that enable us to answer unanticipated questions quickly and accurately.

As the Knox County Schools plan demonstrates, these reopening playbooks, particularly for those districts who intended to open the buildings in person, were comprehensive and detailed documents. The length of Detroit's reopening plan was 42 pages (Detroit Public Schools, 2020); Newark's plan was 25 pages (Newark Board of Education, 2020); and Little Rock's plan was 31 pages (Little Rock School District, 2020).

By late August, reopening playbooks across the United States, as briefly discussed earlier regarding family survey options, generally featured three common reopening formats, namely in-person school, virtual school, or a hybrid model. According to the American Association of School Superintendents in early September, approximately 10% of superintendents reported opening schools fully in-person, about a third fully virtually, and about half in a hybrid format (Quilantan & Goldberg, 2020). Hybrid models generally entailed some level of alternating attendance that would allow for fewer students on-site at any given time, enhancing schools' ability to ensure social distancing in classrooms, hallways, common spaces, and on school busses. These alternating schedules included scenarios where certain groups of students would attend school in-person on Mondays and Wednesdays while others would come to school on Tuesdays and Thursdays with all students learning remotely on Fridays—or variations along similar lines. While alternating in-person student attendance addressed some of the district's virus-mitigation concerns, hybrid models added a layer of complexity to the resolution. Not only were teachers juggling one group of students in their classrooms in person while tending to the needs of other students working from home at the same time, but all the elements of virtual learning and in-person learning were at play at the same time resulting in a combination of equally unpleasant choices.

Connecting through Digital Media

The pandemic presented yet another challenge in actually delivering the messages that schools attempted to communicate. As society shut down, traditional communication channels such as Parent Teacher Association meetings stopped and the ability to deliver paper messages to the home disappeared. Even local school board meetings moved to virtual settings. Thus, communication streams shifted even more heavily to digital tools at a time when the need for frequent communication between home and school intensified. While school leaders had already developed some digital media skills and practices, the pandemic accelerated and transformed those trends into standard operating procedures.

One of the first, most notable changes as the pandemic began to unfold was a radical new approach to school webpages. In the past, school websites served the primary purposes of school promotion and dissemination of basic information. School websites were often difficult to navigate, particularly in regard to regular communication between families and school leaders. As schools began to close in person, districts quickly adapted their webpages taking drastic measures to prioritize the communication flow about pandemic-related decisions. For instance, Omaha Public Schools (2020) added two additional top-level headers above the normal page. The top-level, full-page header announced the decision to use a 100% remote learning instructional model with a link to the district's overall implementation plan. Immediately below that appeared a full-page header with specific links to health and safety protocols, the 1:1 technology plan, a COVID-19 FAQ, and a Meals2Go link for the district's food service distribution plan.

Tulsa Public Schools (2020) took the concept a step further by dedicating the complete, full screen of the homepage exclusively to pandemic- and school-related issues. A rolling, full screen image featured the Distance Learning Plan, a Back-to-School

FAQ, Technology Support, and a Meals Plan. Only by scrolling down did any other information about the school district even appear on the screen. These types of dramatic changes to school websites were unprecedented before the pandemic.

Second, public meetings transformed during the pandemic. Everything from school board meetings to legislative hearings changed to digital video conferences seemingly overnight. Video platforms such as Zoom.us, Microsoft Teams, Google Meet, YouTube Live, and Facebook Live became the new public forum. As public meetings are governed by an extensive amount of law, this transition was not as simple as just publicizing a video link. The Virginia School Boards Association (2020) published a 14-page single-spaced guiding document for school divisions that addressed technology options, software settings, meeting notification requirements, public comment management, and disability supports, and more. Other states offered similar guidance. The Texas Association of School Boards (2020) hosted an hour-long webinar with their legal director on how to hold remote board meetings. Superintendents, who traditionally facilitate local school board meetings, now had to manage some of the most complex board meetings of their careers while also juggling the technology and legal demands of communicating on new digital platforms.

The use of YouTube as a communication platform further exploded during the pandemic. Not only were school board meetings now on video to be watched live online, but other communication flowed through the video channel as well. The Greater Albany Schools, New York, School Board Meeting on August 3 (2020), for example, was streamed live on YouTube and viewed over 8,000 times as they announced their reopening plan, vastly more views than any other video on their channel. The YouTube Townhalls held by Birmingham Public Schools for elementary and secondary education in early August of 2020 were each viewed more than 2,500 times. Live broadcasts of 2020 high school graduation ceremonies across the United States were also big hits on YouTube with the Seattle Public Schools' high school virtual graduation ceremonies (2020) attracting over 35,000 views.

Other platforms also became essential communication tools. Facebook in particular was central to messaging efforts. In Wilson County Schools, a suburb of Nashville, TN, regular video updates on Facebook helped navigate back-to-back crises. Shortly before the pandemic, the town was hit by a tornado that destroyed two school buildings overnight. Weekly on Facebook (2020), Bart Barker, the Public Information Officer and former reporter for a local television station, posted videos that took viewers inside the schools and the convenings of the local school board.

The videos featured tours of the tornado-damaged buildings and provided basic information about school operations. As the pandemic emerged, the district transitioned communications using this now highly viewed platform to provide updates on decisions related to COVID-19. From the night of the tornado on March 3, 2020 to the start of the following school year on August 17, the district posted over 50 well-produced videos on their Facebook (2020) page in an effort to keep the community informed.

Many of these digital tools were previously used, but the increase in communication utilizing these platforms exploded during the pandemic. The tools transformed into a critical information pipeline to keep a confused public informed of time-sensitive decisions as they broadcast everything from public meetings to school and community celebrations.

Challenges, Unexpected Opportunities, and Silver Linings

At the time this chapter was written, September 2020, the pandemic rages on. School districts still struggle to cope with continuing challenges presented by safely reopening schools while coronavirus cases are at an all-time high in the United States. As of September 7, 2020, according to COVKID (2020), a tracker of infection rates in children, over 600,000 children in the United States had confirmed positive COVID-19 tests. In many cases, schools that reopened buildings were forced to close them as outbreaks occurred and the potential for rolling outages throughout the fall loomed.

A high profile, early reopening school district in Paulding, Georgia, outside Atlanta, attracted national attention for suspending students (Hawkins, 2020) for taking pictures of crowded school hallways with students not wearing masks. After the photos received massive media attention, the suspensions were lifted (Nieto, 2020). Around the same time, nine students tested positive and the buildings were quickly closed (Tagami, 2020). Similar chaotic reopening stories continue well into the fall of 2020.

Despite the ongoing nature of the pandemic, some early conclusions about effective school communication during a pandemic can be drawn. There are many challenges on the horizon, but there are also unanticipated opportunities ahead. This section first presents some of the remaining challenges before turning more optimistically to the silver linings.

Emergency Communications Beyond a Moment in Time

Emergency communications must be seriously reconsidered in light of the ongoing challenges presented by the pandemic. Schools typically plan in advance for emergencies and develop detailed plans to be consulted at a moment's notice. Local school policy addresses emergency management protocols, and various handbooks are on hand to guide administrative response. Nearly all of the crises addressed in these documents, however, are single moment-in-time disasters such as fires, earthquakes, tornados, or even active shootings. In a single-event disaster, timelines may extend beyond the event but are condensed into shorter timeframes.

Within the realm of emergency plans, school district policy often addresses communicable diseases. However, an analysis of many of those policies reveals little consideration of a pandemic of global proportions. For instance, the Albuquerque NM Policy on Communicable Diseases (2020) addressed the district's approach to determining and taking action steps to address a single student with a communicable disease and how to mitigate the student's interactions with the broader student population. Everything in the policy is geared to address the individual case, not a widespread societal outbreak, and the concept of contact tracing is not at all developed.

In 2007, the United States Department of Education, through the Emergency Response and Crisis Response Technical Assistance Center, invested in a series of supports for schools to develop crisis response plans. As part of that series, the department issued guidance on various potential crises. Helpfully, a plan for managing infectious diseases was included (Emergency Response and Crisis Management Technical Assistance Center, 2007). This document provided a case study and response plan for a viral encephalitis outbreak that infected two students, killing one. Families withdrew their students from school, cleaning procedures were implemented, the school

struggled to communicate, and political actors intervened, but the incident was resolved within seven weeks and impacted only two students. While the 2007 viral outbreak guidance clearly has applicable components, it shows how drastically unprepared schools were for a viral pandemic that lasted months, if not years, and infected thousands.

A significant lesson learned from the coronavirus pandemic is that robust policies, procedures, and plans must be developed to assist local school districts in an ongoing crisis of this magnitude. This guidance must capitalize on the experiences of 2020 and address the long-term closing of school buildings and the effective implementation of virtual and hybrid school models. Long-term school closures were a part of the response to the Spanish Flu of 1918 (Maher, 2020) and again with COVID-19 in 2020. While still extremely rare, new efforts to plan for similar public health crises in the future, including ongoing collaboration with local health departments and the ability to access and rely on scientifically sound information to make decisions, are paramount. In the absence of such scientifically reliable plans, school decision-making will be once again overwhelmed by competing political interests.

The Need for Chief Communications Officers

Communicating with the public has long been an expectation of school superintendents. The Ohio Standards for Superintendents (2008) Standard 2, "Communication and Collaboration," asks superintendents to communicate to the local board of education, maintain effective relationships with school personnel, and engage the external community. This broad expectation encompasses many layers of communications responsibility. The pandemic exponentially multiplied these layers and required communication skills that exceeded those of most superintendents. Communications during the pandemic became more than a full-time job while superintendents were simultaneously expected to make sense of public health data, transition to online schooling, manage board relations, and lead internal emergency response—to name only a few. Basic functions during the pandemic, such as hosting school board meetings on Zoom, were a stretch for many leaders, and technical and communications support was desperately needed.

Districts that employed a chief communications officer seemed to fare better. From the development of reopening playbooks, leveraging social media, answering media inquiries, and communicating internally with families and staff, the communications challenges were extensive and unrelenting. The role of the chief communications officer is not new. The National School Public Relations Association has existed since 1935 to advance the field of school public relations and has chapters in 33 states providing support to local districts. While tight budgets may not permit the full-time employment of a chief communications officer in smaller systems, the pandemic highlighted the need for every district to have immediate access to communications experts with specialized training to support the superintendent in the critical functions related to crisis communications during and beyond a pandemic. It is unrealistic to expect superintendents to have all the requisite skills of instructional leader, political leader, organizational manager, and public relations and communications strategist. Providing additional support for communications efforts has become essential as districts think beyond the pandemic.

Teachers as Strong Family Communicators

While district communications throughout the pandemic hit both highs and lows, the communication that grew among teachers, students, and families during online learning was an unexpected silver lining. Teachers have long been expected to develop strong relationships with students and their families, but the extent of the relationship traditionally centered on infrequent communication about student performance or school events. During the pandemic, though, teacher communication with families increased dramatically as schools shifted to remote learning. Particularly for elementary students, the facilitation of effective online learning required a daily working relationship between family members and teachers, and those relationships seemed to strengthen over time.

Largely because of this teacher-level effort, the initial public response to the shift away from in-person learning was positive. A survey of 500 parents by the American Enterprise Institute found in April and May of 2020 that 70% of parents said their school was doing either an excellent or good job with continued learning (Bailey, 2020).

The deeper relationships with families represented one of the several unexpected silver linings found by teachers, many of whom developed a new penchant for communicating with students beyond the curriculum to matters of social-emotional learning during the stressful year. Teachers adjusted to new schedules that included additional student check-ins and advising time. While families struggled to cope with a variety of pandemic-related fears and circumstances, teachers often became a lifeline for students. The National Education Association called for social-emotional learning to be a priority during the pandemic (Walker, 2020b), citing Christina Cipriano of Yale's Center for Emotional Intelligence that "it is impossible to expect teaching and learning to occur without attending to our emotions." While not all teachers have mastered social-emotional teaching and communication, the broad embracing of this responsibility has been an unexpected silver lining and one that is likely to endure beyond the pandemic.

Online Teaching and Digital Tools

The single most enduring shift during the pandemic, perhaps across all industries, will likely be the proliferation and use of online communication tools. In the case of education, in addition to the surge in the use of social media and video as communication platforms, the usage of digital tools to advance learning is yet another silver lining. Education, as an enterprise, had been slow to digitize, continuing to rely heavily on physical tools like textbooks, school spaces, and face-to-face teaching as the primary drivers of student learning. However, in 2020, a global transition to digital schooling is underway.

The World Bank (2020) and UNESCO (2020) are tracking the deployment of new learning tools across nearly every nation. While all countries continue to struggle with universal Internet access and device deployment challenges, in the relatively wealthy United States, the transition to online learning tools such as learning management systems, video communication platforms, and collaborative productivity suites accelerated substantially during the pandemic. School districts bought so many Chromebooks that supply chains tightened. Philadelphia bought 50,000 (DeNardo, 2020). Louisville bought the same number of Chromebooks but also 10,000 wireless hotspot Internet access points (Hayden, 2020). Raleigh bought 85,000 new devices, in

addition to an existing 80,000, with the goal of providing all 162,000 students a device to take home by the 2021–2022 school year (Hui, 2020).

To structure learning on these newly deployed devices, states and districts rapidly deployed learning management systems (LMS). Schoology entered a new partnership with Texas to provide its LMS to all schools within the state (Texas Education Agency, 2020). Additionally, at least 10 states partnered with Canvas to offer statewide access with two of those states, New Hampshire and Wyoming, having made Canvas available for all learners from Kindergarten to College (PR Newswire, 2020). The use of system-wide platforms provides teachers the ability to collaborate more easily, link to primary sources, grade more efficiently, and maintain a real-time learning relationship with students. Such digitization makes learning more transparent to students and families. Overall, this rapid digitization of schooling represents a generational transformation in the technology of schooling and is likely to be an enduring silver lining of the pandemic of 2020.

Conclusion: Navigating the Narrow Pass

The year 2020 presented a shock to our educational systems. Nonetheless, silver linings emerged and schools managed to communicate through myriad challenges in new, more powerful ways by engaging in community surveying, developing playbooks, enhancing websites, and more broadly utilizing social media and digital teaching and learning tools. As a result, teachers are accessing new technologies and pedagogies as they engage with students on a more humane, social-emotional level. Such silver linings are a tribute to the resilience of educators, students, families, and the broader community and hopefully represent indelible and powerful changes to the learner experience well beyond the pandemic.

Schools were undeniably caught off guard by the coronavirus pandemic and were ill-prepared for the scientific analysis, communication challenges, teaching and learning shifts, and the ambiguity they faced as they navigated uncharted waters. As a result, school leaders were incapable of the independent decision-making to which they were accustomed and found themselves in the crosshairs of emerging, often conflicting scientific data, intense political pressure and very real quandaries about the safety and welfare of the children and adults they served. Their duties of care and responsibility were misaligned, and they were faced with too many equally unpleasant choices.

For school leaders, the pandemic quickly positioned them on the frontlines of school reopening decisions without the information, tools, and support they needed to be confident and successful. Ultimately, as school leaders navigated the morass of 2020, they found themselves caught between the devil and the deep blue sea. Public education and its heroic leaders will emerge on the other side of this harrowing journey, but not unscathed.

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16

Controlling the Narrative

Mixed Messages and Presidential Credibility

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In what has been described as the worst year ever, 2020 brought the coronavirus and subsequent COVID-19 pandemic to the world, producing major challenges at every level for the global community (Brandus, 2020; Delaney, 2020). The effects of COVID-19 pandemic placed the United States at or near the top-most lists of countries experiencing the crisis in several categories associated with the virus, including number of cases testing positive and number of deaths resulting from the virus. While the number of positive cases in the world continues to rise (Kaiser Family Foundation, 2020), the total of US confirmed cases has exceeded 29 million infections with over 530,000 confirmed deaths. These figures for the US grow each day, with the death toll expected to reach about 550,000 or higher by the end of the year (New York Times, 2021).

In addition to these alarming health statistics, the combination of economic, racial, and political exigencies intersecting in the current health crisis has challenged state and local governments to manage them (Risk and Social Policy Group, 2020). Decision makers at every level have balanced their mitigation strategies in response to these intersecting crises and have communicated their plans to multiple publics. Across the board, governments, organizations, businesses, and multiple publics have faced conflicting perspectives on what to do to bring back a sense of normalcy to their operations and lives.

Through it all, President Donald J. Trump played different and conflicting roles. As Taylor (2020) chronicled: On January 31, President Trump restricted entry to the United States by any foreign nationals from China, and on March 11, he halted travel from European countries other than Great Britain (later added to the list). He downplayed the severity and longevity of the threat, despite the United States becoming on March 26 the country hardest hit by the pandemic. In April, through Twitter, President Trump encouraged his supporters to protest social distancing and other restrictions imposed in states led by Democratic governors, and in May, when the death toll in the United States exceeded 100,000, he took no responsibility for the crisis, instead saying that China had "instigated a global pandemic." By mid-summer, the Trump Administration notified the United Nations of US intentions to withdraw from the World Health Organization (WHO) effective July 6, 2021, and as cases continued to spike across the country, it took until July 11 for President Trump to publicly wear a mask for the first time.

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President Trump also espoused positions challenging the medical and public health communities by rejecting the scientific basis for requiring the mandatory wearing of masks, promoting hydroxychloroquine as a medical response to the virus, and considering the possibility of injecting disinfectants into the body or using strong lights to kill the virus. He publicly disagreed with and condoned the discrediting of his medical and public health advisors—particularly Dr. Anthony Fauci—while tweeting and retweeting messages from doctors proclaiming what the medical community described as conspiracy theories and unproven facts about the cause of the virus and strategies to mitigate it.

Overall, the talking points of the Administration reflected a range of narratives that sharply contrasted with objective scientific facts and assessments presented by members of the scientific and public health communities. This intersection of confrontation between pandemic narratives and objective scientific facts is the nexus of this chapter addressing the research question: How did mixed messages about the novel coronavirus and ensuing COVID-19 pandemic by President Trump and members of the scientific and public health community contribute to the lack of convergence regarding the Administration's credibility?

What follows is a discussion of the role science plays in society, how the pandemic is politicized in the current context, and the role of the media in the process. The theoretical framework for the chapter describes the rational world and narrative paradigms; truth and credibility in decision-making; and the convergence of "fake news," counternarratives, and conspiracy theories as they reveal the tensions between science and politics. Examples of key themes and mixed messages are offered to illustrate the conflicting positions, followed by discussion and directions for future research.

The Role of Science in Society

Throughout US history, science has played a central role in policymaking and government. While science is not the only variable affecting decision-making, Goldman et al. (2017) provided a chronology of examples, beginning with a reference to the importance of science in the first article of the *US Constitution*, illustrating how science repeatedly has contributed to the government's response to serious challenges affecting the nation's public health security. Politics aside, they noted, "A commitment to scientific integrity in federal policymaking is not a partisan issue. Rather, it is an enduring bedrock principle upon which US democracy was built" (p. 1).

Reliance on science as a basis for making sound policy decisions generally has prevailed, with a few exceptions. Arguments based upon scientific facts provide policymakers with legitimate proof capable of withstanding the challenges from conflicting claims. The long relationship of science with government is reflected in laws to protect the environment, as well as laws protecting citizens from circumstances that would threaten their health or well-being. In matters of public health, the scientific integrity of the information being used to prevent loss of life or mitigate the effects of a crisis generally has remained, "free from inappropriate political, ideological, financial, or other undue influence" (Goldman et al., 2017, p. 3). In this relationship, the integrity of the scientific information is essential.

Some notable characteristics of science contributing to its integrity include transparency, objectivity, verifiability, and its impersonal nature (Goldman et al., 2017; Weiler, 2018). In general, "scientists are among the most trusted people in public life" (Donner, 2017, p. 431). In contrast, partisan news hosts reflecting narratives that contradict established facts (Landreville & Niles, 2019) compromise the publics' access to objective and reliable information as a foundation of knowledge about matters affecting their personal health and well-being. Verifiable, reliable information is key to counter disinformation, support independent journalism, empower people with media and information literacy, and meet international standards for freedom of expression: "All four lines of action are essential for the right to health, one of the economic, social and cultural rights recognized [sic] by the international community" (Posetti & Bontchova, 2019).

The Centers for Disease Control and Prevention (CDC), National Institutes of Health, National Institute of Allergy and Infectious Diseases, World Health Organization, American Public Health Association, Johns Hopkins University of Medicine's Coronavirus Resource Center, The COVID Tracking Project, and the US Food and Drug Administration are among the most trusted US agencies, organizations, and academic institutions providing scientific or public health information (Union of Concerned Scientists, 2020). Using these agencies as sources of independent scientific information helps to create legitimacy, public support, and credibility. Without credible sources of information, science can be manipulated by partisanship and other influences within government (Goldman et al., 2017).

The Politicization of Science

Despite the recognition that having access to objective and impartial science is preferred when guiding public action, American presidential administrations have politicized science when it suited their legislative agendas. What has been characterized by the ideological left as President Trump's "disdain for science" began when his Office of Management and Budget issued his budget blueprint "to make America great again," laying the groundwork for the creation of a pro- and anti-science dichotomy based upon party loyalty (Hardy et al., 2019). As the Trump Administration's environmental policies were revealed, a partisan sorting occurred, with Republicans and Democrats using science as an identity marker, placing them in opposition over the credibility of the science used when reporting about global warming: Pro-Trump Republicans became anti-science advocates rejecting claims about global warming and enacting policies opening the environment to private interests, and anti-Trump Democrats accepted the scientific predictions about global warming and used this position to justify their opposition to conservative policies they predicted would lead to the destruction of the planet. Hardy et al. (2019) suggested that when such conflicts are activated, "partisans ... sort themselves on issues above and beyond any cognitive engagement with the issue" (p. 91). In other words, even if they accept the scientific facts as credible, the partisan divide creates the opening to politicize science and casts doubt on the existence of scientific consensus (Bolsen & Druckman, 2015).

Critics argue that Trump's anti-science actions violated "the principles and/or policies of scientific integrity" (Berman & Carter, 2018), particularly, "the processes

through which independent science fully and transparently informs policy decisions, free from inappropriate political, ideological, financial, or other undue influence" (Goldman et al., 2018, p. 269). Because scientific findings are built upon probability, an inherent uncertainty enables opponents of science to question and discredit the content and source of the information. Thus, when partisan narratives and objective facts are in opposition, the focus shifts to the integrity and credibility of science and scientists themselves (Hardy et al., 2019).

The current anti-science perspective rose dramatically in response to 2019–2020 coronavirus COVID-19 as critics challenged scientific experts about the nature and extent of the crisis. Conservatives claimed that scientists and their allies were motivated by a liberal agenda, making their messages less credible. The pro-science advocates viewed the rejection of scientific information as leading the United States to an apocalyptic outcome. Jamieson and Hardy (2014) studied a similar politicization of science's credibility regarding global warming and found that consensus on scientific facts was impossible once partisan alignment occurred.

In the case of COVID-19, the anti-science supporters viewed the Democratic position as leading to the undermining of individual freedoms and the dominance of the Democratic party. Their anti-science messages focused on the origin, spread, and incidence of the disease; symptoms and treatments; and responses from governments and other actors, to name a few.

The Role of the Media

In times of national crisis, the creation of a primary narrative typically comes from the president or an elected leader who represents the position of the government or authority. Due to the nature and potential impact of a national crisis, the media and government rely on factual and scientific information as a basis for upholding the primary narrative. Opposition in the form of counternarratives comes from counterpublics, or those who reject the primary narrative for ideological reasons and seek to discredit authority, or in this case science, and question the facts to promote and act out their opposition to the primary narrative.

In the current crisis, the media created a rhetorical environment whereby the primary narrative yielded to anti-science advocates when President Trump was depicted as being in conflict with science, thereby creating a primary narrative running contrary to public health warnings, recommendations, and practices. Anti-science rhetoric was given voice with President Trump's endorsement becoming the primary narrative. This primary narrative was accepted by the Republicans who believed that the virus was exaggerated and that the federal government should leave the management of the crisis to state and local leaders. The supporters of President Trump were encouraged to promote this primary narrative and exercise their right to reject the advice of public health experts.

Due to mainstream media's depiction of the pandemic as apocalyptic, a counternarrative to the primary narrative emerged, supporting the recommendations of public health officials and scientific experts. Included were the CDC and WHO reports providing worldwide pandemic data, pressure points straining existing healthcare delivery systems, updates from researchers and scientists, and recommendations to

reduce the risk of contracting the virus. This counternarrative to the Trump Administration's primary narrative was accepted by Democrats and others critical of President Trump's handling of the crisis.

Theoretical Framework

To respond to the research question, an examination of the theoretical framework of how people evaluate claims and reasoning, the relationship between trust and credibility, and how narratives are characterized and prioritized is warranted.

Rational World vs. Narrative Paradigms

Whenever opposing claims are made, audiences are placed in a position of evaluating whether they are based upon good reasons. To explore the basis for what constituted a good reason, Fisher (1978) expanded the definition to include more than just the use of facts and reasoning as a basis for decision-making. He concluded that good reasons were "those elements that provide warrants for accepting or adhering to the advice fostered by any form of communication that can be considered rhetorical" (p. 378). The inclusion of values within Fisher's definition set up the basis for his later work developing the narrative paradigm. He proposed the narrative paradigm to be "a dialectical synthesis of ... the argumentative, persuasive theme and the literary, aesthetic theme" (Fisher, 2017, p. 263). To distinguish between these perspectives, Fisher contrasted the rational world paradigm and the narrative paradigm as a means for evaluating arguments. These paradigms offer clarity when applied to the current study.

The epistemic orientation of the rational world paradigm relies on facts and information from experts. Humans are rational beings who rely on argument to make decisions. Arguments follow conventions appropriate for the situation and "rationality is determined by subject matter knowledge, argumentative ability, and skill in employing the rules of advocacy" (Fisher, 2017, p. 265). In this paradigm, field experts who understand the rules of argumentation dominate the discussion with the superiority of their rational discourse. In so doing, they instruct citizens about what constitutes legitimate fact or logic. Fisher concludes, "Only experts can argue with experts and their arguments" (p. 274).

The narrative paradigm rests on the supposition that humans are storytellers, and in this mode, stories are good reasons to support an argument (Fisher, 2017). The origins of stories vary by context and culture of the participants, but rationality is determined by "their inherent awareness of probability, what constitutes a coherent story, and their constant habit of testing narrative fidelity, whether the stories they experience ring true with the stories they know to be true in their lives" (p. 269). With narratives, all people become experts as storytellers and, thereby, can engage in the process of deciding what to believe.

Thus, when evaluating conflicting positions, people must discern the quality of the good reasons used to support arguments and identify the difference between information that is authentic and misinformation or disinformation that is fraudulent. Because people are not able to identify or understand the difference (McDevitt & Ferrucci, 2018), those who accept the rational world paradigm reflect intellectualism and the

essentiality of intellect, experts, and expertise. Contrasted with this group, those who accept the narrative paradigm tend to be skeptical of intellectuals and suspicious of reason-based reporting. As Hofstadter (1963) aptly described, "the common strain that binds together the attitudes and ideas which I call anti-intellectual is a resentment and suspicion of the life of the mind and of those who are considered to represent it" (p. 7). Despite Fisher's intent to expand the circle of good reasons to include values and value-laden perspectives, the oppositional paradigms appear mutually exclusive when brought into conflict by crisis. As Fisher concludes, "narrative rationality ... is inimical to elitist politics, whether fascist, communist, or even democratic—if traditional rationality is the prevailing societal view" (p. 270). When the prevailing view becomes the narrative paradigm, reliance on the rational world paradigm in society is challenged.

Trust and Credibility

Previous health crises (e.g., SARS, swine flu, and Ebola) have demonstrated the critical importance of developing trust to influence public perceptions about their severity, transmissibility, and necessary mitigation strategies (Balog-Way & McComas, 2020). Several factors influence how trust develops, including consistency, transparency, and reliability. If crisis messages and mitigation strategies remain consistent through changing contexts, affected publics may come to trust what is heard or observed. When messages or policies are inconsistent, people lose trust. Gallagher (2020) cited numerous inconsistent messages that were conveyed during the pandemic, prompting publics to distrust what they were hearing.

Transparency also is essential for maintaining the publics' trust: "If the public feels as though they are being misled or misinformed, their willingness to make sacrifices—in this case—social distancing—is reduced" (Fuller, 2020). However, trust may be undermined when too much information is provided from the media, government briefings, and family and friends. In the face of conflicting messages, the publics may become frustrated and more confused about which source to trust. Balog-Way and McComas (2020) proposed that "effective transparency requires thoughtful risk communication that helps audiences understand uncertainties alongside the information having a strong scientific consensus. Without careful communication, there is no real transparency" (p. 3).

Another factor contributing to the development of trust is the quality and credibility of the information being received by publics (Belanger & Szmania, 2018; Gualda & Rúas, 2019). One element of quality comes from those who are regarded as experts (Donner, 2017). For example, Dr. Anthony Fauci and Dr. Deborah Birx are highly regarded scientists (Balog-Way & McComas, 2020). Experts are trusted for their integrity. However, when mixed messages come from the scientists and public health officials the publics have come to trust, their expert credibility is put in question. Once the trust has been lost, those who have accepted the primary narrative to challenge science and scientific information will consider the inconsistent messages to be proof that the facts are fake.

"Fake News," Counternarratives, and Conspiracy Theories

The challenge of determining who and what to believe has pushed audiences to evaluate all sources of evidence with skepticism. What once was regarded as credible

information (e.g., scientific, fact-based evidence) has been replaced with alternative facts, counternarratives, and conspiracy theories. In a rhetorical environment where the primary narrative of the president reflects an anti-science perspective, these alternative sources of information have become the primary narrative, and the floating signifier of "fake news" (Farkas & Schou, 2018) has been used to discredit the pro-science sources. While the term "fake news" describes any information that challenges the espoused narrative, in this context of categorizing any scientific evidence as "fake news," the proponents of the primary anti-science narrative have attempted to cast doubt on the pro-science opposition with misinformation, disinformation, and politicization.

When exploring existing research on the typologies of false information, Farkas and Schou (2018) noted that most studies have focused on how and why misleading content is produced, disseminated, and accepted. But, rather than focusing on the truthfulness or falsehood of information, they examined "fake news" as "a discursive signifier that is part of political struggles," and analyzed "how different conceptions of 'fake news' serve to produce and articulate political battlegrounds over social reality" (p. 300). Their findings confirmed that "fake news" was used in fundamentally different ways by opposing political groups to construct political identities and conflicts. When both pro- and anti-science advocates used "fake news" to describe the information presented by their rivals, the term became a "floating signifier" (Laclau, 2005) used by both sides as they struggled to hegemonize their information and win the struggle against the other, repressing all other forms of meaning.

Within the public sphere, Habermas (1991) explained that publics and counter-publics are created through their rhetoric. Warner (2002) described counter-publics as communities that "mark themselves off unmistakably from any general or dominant public. Their members are understood to be not merely a subset of the public but constituted through conflictual relation to the dominant public" (pp. 117–118). In their study, Salek and Cole (2019) used the dominant public and counter-public paradigms to focus their examination on the apocalyptic Twitter counter-public that mobilized during the 2014 Ebola outbreak. Donald Trump was among those in the counter-public who questioned the Obama Administration's response. In that instance, President Obama represented the dominant public and the counter-public organized using social media outlets to fabricate and share misinformation and/or disinformation. The transposition of the dominant public and the counter-public in the present study, whereby the counter-public embraced the primary narrative of the Trump Administration and the dominant public is represented by the counternarrative of the scientific and public health communities, creates an opportunity to gain insight into what happens when the national leader espouses counternarratives that reflect mixed messages about the credibility of science during a public health crisis.

In the process of developing counternarratives, a new dimension of reality has emerged where "facts matter less than the sensations and emotions they provoke" (Gualda & Rúas, 2019). In this context, advocates who spread disinformation that intentionally spread falsehoods as news via social media can spawn conspiracy theories, with the intention to systematically interrupt the flow of mainstream news. In the current COVID-19 crisis, "most Americans (71%) have heard of a conspiracy theory circulating widely online that alleges that powerful people intentionally planned the coronavirus outbreak. And a quarter of US adults see at least some truth in it—including 5% who say it is true and 20% who say it is probably true" (Schaeffer, 2020). These

findings drawn from a Pew Research Center survey reflect demographic and partisan differences that illustrate a confirmation bias, "a human tendency to obtain information that fits our belief systems, playing an essential role in the cascading generation of information" (Gualda & Rúas, 2019, p. 191).

The social media platforms that circulate conspiracy theories and disinformation reinforce the counternarratives used by the anti-science partisan groups. As Salek and Cole (2019) concluded in their study of apocalyptic counter-public rhetoric during the Ebola outbreak of 2014, counternarratives can create an environment where traditional authority structures are questioned (e.g., reliability of scientific knowledge and legitimacy of government). In the absence of consistent messages, fact-checking, and credible sources of information, democracy is undermined, and publics become more susceptible to narratives of authoritarian leaders.

In summary, when the United States has faced national crises, its leaders traditionally have constructed primary narratives aligned with the rational world paradigm. Challengers of national leaders have developed counternarratives to delegitimize the basis for the primary narrative. In the present public health pandemic, President Trump has espoused an anti-science perspective as the primary narrative. This has transposed the pro-science rational world paradigm to the counternarrative role and placed those opposing President Trump into the position of fact-checking and refuting the Administration's primary narrative. To address the question of how mixed messages from the anti-science and pro-science advocates about the COVID-19 pandemic contributed to a lack of convergence regarding the Administration's credibility, the identification of selected conflicting statements from President Trump and leading public health and political officials will be compared and discussed.

Identification of Conflicting Information

Examples of conflicting information from the anti-science and pro-science advocates were drawn from nine key themes describing points of disagreement about COVID-19, including origins and spread of the coronavirus; false and misleading statistics; economic impacts; discrediting of journalists and credible news outlets; medical science—symptoms, diagnosis, and treatment; impacts on society and the environment; politicization; content driven by fraudulent financial gain; and celebrity-focused disinformation (Posetti & Bontchova, 2019). To focus the discussion, this analysis includes examples from three of these themes: the origin and spread of the virus, medical diagnosis, and potential treatments.

CNN Transcripts accessed through Nexis Uni from January 31 through August 6, 2020, using the search terms "Donald Trump," "COVID-19," and "press conferences," yielded pro- and anti-science messages made by President Trump and those providing counternarratives. CNN Transcripts was an appropriate source of the data for this study for several reasons: CNN has been used successfully in previous research; CNN is a recognizable brand of news that provides comprehensive coverage of politics; CNN adheres to an American journalistic tradition (where the press is considered to be the fourth estate); CNN is skeptical and insistent on verifiable facts and consistent logic; and CNN has archival news on its website, providing access to their coverage on specific issues during specific periods (Bashri et al., 2012).

Origin and Spread of the Virus

When President Trump deflected criticism about his Administration's actions to get control of the virus with the statement, "No, I don't take responsibility at all" (Sanchez et al., 2020), he opened the door to assigning blame to others, including China and the WHO. Blaming the source was one of President Trump's early narratives, fueling a conspiracy that the Chinese government intentionally was covering up a crisis caused by a lab in Wuhan: "I think they made a horrible mistake, and they didn't want to admit it" (Lemon et al., 2020). President Trump blamed the WHO for not pursuing the facts: "Had the WHO done its job to get medical experts into China to objectively assess the situation on the ground and to call out China's lack of transparency, the outbreak could have been contained at its source ..." (Blitzer et al., 2020, April 14).

In contrast, US intelligence confirmed by key US allies reported that the coronavirus outbreak likely originated at a Wuhan market and not a lab. As David Culver, a CNN correspondent reported, "This is coming from a Western diplomatic official who's familiar with intelligence from the Five Eyes intelligence sharing coalition. ... It really contradicts what President Trump and Secretary of State Mike Pompeo have been pushing as the Wuhan Institute of Virology being the lab that this leaked from" (Berman et al., 2020). General Mark Milley, Joint Chiefs Chairman, agreed that while different scenarios were being investigated by the US military and US intelligence community, the virus was not released purposefully (Blitzer et al., 2020, May 5).

Once the virus was detected in the United States, President Trump predicted that the pandemic would be over quickly. Trump repeated often: "It is ... going to go away hopefully at the end of the month" (Blitzer et al., 2020, April 1). This narrative built upon his belief that warmer weather would decimate the virus: "You know, in April, supposedly it dies, with the hotter weather and that's a beautiful date to look forward to ... in theory, when it gets a little warmer, it miraculously goes away" (Cooper et al., 2020, April 14).

The difference between the president's narrative and that of his chief advisors became more pronounced as the pandemic extended into the summer months. Trump maintained his narrative: "Well, I think we're doing a great job." However, Dr. Deborah Birx, White House Coronavirus Task Force Coordinator countered: "It is extraordinarily widespread. It's into the rural as equal [to] urban areas. And to everybody who lives in a rural area, you are not immune or protected from this virus ..." (Blitzer et al., 2020, August 3).

Throughout the shutdown, counternarratives attacking the primary narrative came from public health and scientists. Dr. Celine Gounder, CNN medical analyst, criticized President Trump: "I think the president has frankly been very dishonest ... whether it's here in the United States or elsewhere. We have been saying as infectious disease experts and epidemiologists ... for months now that it was inevitable that the virus would eventually spread out sort of like falling like dominoes" (Church et al., 2020). After six months and a growing number of cases in the United States, President Trump ceded in an interview with AXIOS correspondent Jonathan Swan, "They are dying, that's true. It is what it is..." (King et al., 2020).

In summary, the Trump narratives that blamed China and the WHO and downplayed the magnitude and spread of the virus were challenged by the counternarrative that the virus was spreading and its magnitude was not decreasing in the United States.

Medical Diagnosis

President Trump constantly provided a narrative that minimized the severity of the virus and suggested that recovery was imminent. In March, he minimized the effect: "... healthy individuals should be able to fully recover" (Blackwell et al., 2020). In April, he likened the virus to the flu: "This is a flu. ... It's going to disappear, one day, it's like a miracle, it will disappear" (Cooper et al., 2020, April 14).

The president repeated claims that tests were widely available for everyone: "For anybody that needs a test—they are there. They have the test, and the tests are beautiful" (Whitfield et al., 2020). However, Trump's senior public health advisor, Dr. Anthony Fauci provided a more realistic assessment: "We are not in a situation where we say we're exactly where we want to be with regard to testing." Trump pushed back: "I think we're doing a great job on testing. I don't agree. If he [referring to Dr. Fauci] said that I don't agree with it" (Camerota et al., 2020).

When confronted about not providing enough testing, President Trump assigned responsibility to the states: "The individual governors have testing ... there's tremendous testing and the governors will use whatever testing is necessary" (Collins et al., 2020). Countering this narrative, many locations around the country complained about test kit shortages. Forty-five US senators called on Vice President Mike Pence, the Coronavirus Task Force, and the Federal Emergency Management Agency (FEMA) to conduct a national inventory of the coronavirus diagnostic testing supply and to provide a detailed plan and timeline to address future shortages. The Senators wrote: "we continue to hear from our states and Tribal Nations about the lack of supplies and testing kits to diagnose our constituents for the coronavirus" (As coronavirus tests and supplies lag, King and colleagues push V.P. for "Real-Time" public inventory, 2020). Governors joined the counternarrative of insufficient testing, including Illinois Governor J. B. Pritzker who declared: "I asked over and over again for testing from the federal government. They kept saying they would deliver millions of tests across the country. They haven't done that. I've given up on any promises that have been made" (Richardson, 2020).

In short, with regard to diagnosis and testing, the Trump narrative downplayed the severity of the virus and claimed that everyone who wanted to be tested would have access to a test, while the counternarrative portrayed the health risks and unavailability of rapid tests that would facilitate tracing and treatment.

Potential Treatments

President Trump's narratives outlining potential treatment for COVID-19 ran counter to science. In April, he speculated on the benefits of injecting a disinfectant: "And then I see that disinfectant knocks it out in a minute. One minute. And is there a way we can do something like that by injection inside or almost a cleaning?" (Camerota et al., 2020). He also suggested using ultraviolet light in a dialog during a coronavirus press briefing:

TRUMP: "Deborah, have you ever heard of that, the heat and the light relative to—certain viruses, yes, but relative to this virus?"
BIRX: "Not as a treatment. I mean, certainly, fever—"
TRUMP: "Yes."

BIRX: "is a good thing. When you have a fever, it helps your body respond. But not as—I've not seen—"
TRUMP: "I think it's a great thing to look at" (Camerota et al., 2020).

The medical community immediately warned the publics about the danger of following the president's suggestions. Emory University's Dr. Carlos Del Rio responded: "I would remind people that, you know, this is not how you treat a virus. Bleach is great to clean a surface. It's not great to put in your body. It's actually more dangerous. ... We don't need to think—be thinking about things that are more dangerous than the disease" (Camerota et al., 2020).

Another major sources of conflict between the president, his advisors, and the scientific community centered on his endorsement of hydroxychloroquine as a preventive treatment: "I'm a big fan. I've seen things that are impressive. And we'll see. We're going to know soon" (Cooper et al., 2020, March 20). The president claimed: "[The 86-year-old anti-malarial drug, chloroquine] has shown encouraging, very, very encouraging early results. I think it's going to be very exciting ... based on what I see, it could be a game changer" (Allen et al., 2020). He even claimed to be taking daily doses of the drug: "A couple of weeks ago, I started taking it" (Carvajal & Liptak, 2020).

While Trump claimed his endorsement of hydroxychloroquine was "based on evidence, based on very strong evidence" (Blitzer et al., 2020, March 23), Dr. Fauci challenged Trump's proof as "anecdotal evidence." Admiral Brett Giroir, a member of the Coronavirus Task Force, also refuted the president's claims: "At this point in time, there have been five randomized control, placebo-controlled trials that do not show any benefit to hydroxychloroquine" (Blitzer et al., 2020, August 3). Through these examples, the president's narratives suggesting the potential benefits of using non-traditional treatments and drugs as treatments for the coronavirus were challenged by the counternarratives warning people about the harmful effects of ingesting bleach, using ultraviolet lights, and using hydroxychloroquine as an untested substitute for treating the coronavirus COVID-19.

Discussion

This study sought to answer the question of how mixed messages about the novel coronavirus COVID-19 pandemic by President Trump and members of the scientific and public health community contributed to the lack of convergence regarding the Administration's credibility. After identifying the juxtaposition of the primary and counternarratives for the three themes, instead of revealing convergence, the examples revealed mutual exclusivity and a lack of consensus about the president's credibility. Perelman and Olbrechts-Tyteca (1971) established the basis for convergence and mutual exclusivity in their discussion on how multiple arguments can lead to a single conclusion. Rather than coming to complete agreement, convergence occurs when "the likelihood that several entirely erroneous arguments would reach the same result is very small" (p. 471). In other words, as opposing positions converge in the media, the publics discern where there is agreement and accept the convergent position as a basis for their decision. In this context, the consistency of the information, the level of transparency being provided, and credibility of the evidence and experts become the basis for determining which arguments are more credible (Sellnow et al., 2009).

The comparison of the anti-science narratives from President Trump with the pro-science counternarratives offered by political and public health experts demonstrates how mixed messages produced an environment where the credibility of the leader and the credibility of objective scientific facts were not in alignment. Even though the president claimed that during a national crisis, "it's just essential that the federal decision makers ... follow the facts and the science" (Remarks by President Trump, Vice President Pence, and Members of the Coronavirus Task Force in Press Briefing, 2020), Trump relied on narratives that were challenged as not being consistent with facts, espousing misinformation and disinformation, and out of step with the medical and public health community. President Trump's rejection of the rational world paradigm was not unexpected because in so doing, he excluded the opinions of scientific experts in the creation of the primary narrative. Thus, President Trump was able to present his talking points and personal narratives to align himself with his supporters, rhetorically becoming one of the storytellers of the anti-science narrative. This alignment affirmed a distinction made by Richie (2019) in his comparison of the metaphors used by Barack Obama and Donald Trump. Trump's characterization of his supporters as "the forgotten people" and his opponents as "the elites and politicians who inhabit Washington, DC." (pp. 242–243) further polarized those seeking to find convergence in the pro-science and anti-science messages about COVID-19.

The president of the United States has legitimate power because of elected status. In times of crisis, political figures with authority have credibility because they can say and do what is necessary to protect the lives and livelihoods of the publics. Similarly, in times of crisis when the health and safety of publics is in question, scientists and public health experts have earned credibility because of their knowledge power and practical experience in treating public health crises. When the credibility of the presidency is aligned with the credibility of science and the scientific community, the combination has the capacity to positively influence policy decision-makers and the publics about what needs to be done to get the crisis under control. When the president misinforms, disinforms, or conspires, the counternarrative is strengthened and presidential credibility is compromised.

In the case of COVID-19, the pro-science counternarrative claimed, "political leaders are spreading misinformation to minimize the severity of the disease, discredit preventative social distancing measures, and sowing distrust of government data" (Union of Concerned Scientists, 2020). They revealed "insidious forms of disinformation" being spread by the Trump Administration about healthcare workers concerned about the lack of capacity and resources, "inciting confusion over available COVID-19 treatments" and pressuring governors and mayors to reopen. When governmental narratives promoting anti-science and disinformation about public health strategies become primary, and scientific perspectives are restricted or disempowered, the result is the disempowerment of people by what Posetti and Bontchova (2019) described as "active disinformation."

When the presidency represents the counternarrative claiming that scientific evidence is not to be trusted, and the scientific community represents the narrative that the president is presenting misinformation, disinformation, or conspiracies, the publics are placed in what has been described as the "post-fact" era and they must determine the credibility of every claim. In this context, facts become relative and the publics are left to determine which position best suits their political perspective. In

this context, Katz et al. (2020) found that "partisanship, more than any other factor, explained who was worried about Covid-19, and how many social activities they engaged in. Between March and early June, when the study ended, that partisan divide only widened."

Similarly, when pro-science claims and scientific facts are held up to anti-science narratives characterized by misinformation, disinformation, or conspiracy theories, the strength of the rational world paradigm enhances credibility with the publics. A return to the 2014 Ebola crisis supports this reasoning: Because President Obama used the rational world paradigm as a basis for argument, the counternarratives did not have the weight or credibility to displace the primary narrative that the US has the crisis under control. In the 2020 COVID-19 crisis, President Trump used the narrative paradigm as a basis for argument, and the counternarratives using the rational world paradigm carried sufficient credibility to confront anti-science misinformation, disinformation, and conspiracy theories. In the absence of consistent information, transparency, and credible sources, the mixed messages in the public sphere contributed to the publics' indecision about what to do and resulted in an unwillingness to follow the public health recommendations about such things as wearing facial masks, practicing social distancing, and the safe opening of the economy.

Limitations and Directions for Future Research

This study is not without limitations. Initially, the pro-science beliefs of the author must be recognized and may have affected the selection of examples and materials used in this study. In addition, while all humans are storytellers and narratives of crisis "carry meaning, encode lessons, and frame larger public and societal understanding of risks, warning, and potential harm" (Seeger & Sellnow, 2016), as a scholar trained in academic debate, the rational world paradigm provides a comparative advantage for finding convergence and decision-making when misinformation, disinformation, and conspiracy theories are used as reasons for or against a policy.

The three themes selected for this study provided examples of mutual exclusivity and demonstrated more starkly the differences between pro-science and anti-science positions. Future studies could draw from a wider sample of points of disagreement (e.g., opening of schools, legislation to restart the economy) to more clearly depict points of convergence and congruence, or be more narrowly focused on a singular issue to allow for a more nuanced and in-depth view of how audiences perceive conflicting arguments during a crisis. Audience-focused research measuring perceptions of credibility based upon the use of rational world or narrative paradigms would add to our understanding of how mixed messages influence publics' perceptions of national leaders.

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17

Communicating Death and Dying in the COVID-19 Pandemic

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Introduction

The pre-crisis, onset, emergence, and expansion of the COVID-19 pandemic in the United States represent a period of confusion, uncertainty, conflicting health messages, denial of the disease's severity, and efforts to control the data. There were ongoing struggles to understand the level of risk and the potential for harm, which were complicated by the lack of consensus around the data. Competing narratives about the pandemic were associated with differing political ideologies, and these were bolstered by news outlets supporting claims with data in various forms.

One of the important assessments of any crisis concerns the level of harm (Sellnow & Seeger, 2013). While this may involve the severity of property damage and associated costs, number of people displaced, and number of counties impacted, in a pandemic, this assessment usually means the number of people who are sick and the number who have died (Lue, Wilson & Curtis, 2014; Eckhardt et al., 2019).

The assessment of the harm from crises is a complex process (Lindell & Prater, 2003). There are challenges in representations of mortality and morbidity data that can lead to significant public misunderstanding. Problems involve reporting requirements and limitations, case definitions, timing, media needs, and the capacity of the public to understand data. This chapter seeks to expand on the research by Andrade et al. (2020) on mortality and rumor generation during Hurricane Maria in Puerto Rico to better understand how affected publics seek to resolve uncertainty and build resilience in times of crisis. The data on mortality and morbidity that are reported and the ways those data are communicated are important aspects of crisis communication. We first describe the processes and challenge of reporting disease data and what is reported. We also describe the functions of disease reporting and examine the reporting of COVID-19 data. Confusion, manipulation, and censorship of COVID-19 data have undermined the credibility of communication about emerging infectious diseases in ways that will have long-term implications for health communication.

In addition to a review of the relevant literature around communicating morbidity and mortality data, and a discussion of the practices associated with COVID-19, we draw on field notes and personal email messages from one of the authors in his capacity as communication director for Wayne County, Michigan to illustrate data

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collection and dissemination challenges. Wayne County is Michigan's largest county with a population of 1.7 million and home to Detroit, the county seat and the largest city in the state. In addition to the city of Detroit, which is approximately 80% African American, many of its communities have large populations of individuals who come from groups disproportionately impacted by the disease. The county's response to COVID-19 and the challenges it faced provide a unique case study in data collection and communication the associated challenges presented by this pandemic.

Reporting Disease Data

The Centers for Disease Control and Prevention (CDC) is responsible for tracking infectious diseases such as Zika, H1N1 influenza, Legionnaires disease, and HIV/AIDS. To do so, the CDC maintains the National Notifiable Diseases Surveillance System (NNDSS) to support public health agencies monitor, control, and prevent some 120 diseases. The CDC compiles information provided by 3,000 local and state public health departments (CDC, 2020a). Data from NNDSS are used for surveillance, to inform the allocation of resources, to inform responses, and to inform policymakers.

The CDC first identified COVID-19 on January 20, 2020, and soon after its emergence designated it as a nationally notifiable disease. This designation requires local, and state, agencies report to the NNDSS when the disease is diagnosed by doctors or laboratories (CDC, 2020a). Reporting notifiable diseases requires an agreed upon case definition that will ensure cases are counted in the same way everywhere. The case definition for COVID-19 specifies that a confirmed case is defined as a person who tests positive for the virus that causes COVID-19 (CDC, 2020c). The system also requires the cooperation and effective reporting by local health departments, in variable locations, with diverse populations and different resources.

What Is Reported

Public health officials compile a variety of data to assess the state and track the development of an infectious disease. This includes various measures of incidence, prevalence, hospitalizations, mortality, and morbidity.

Incidence is generally reported as the number of newly diagnosed cases of a specific disease. The incidence rate is the number of new cases of a disease divided by the number of persons within the population at risk. Prevalence is a measure of the total number of cases of disease existing in a population at a particular point in time. A prevalence rate is the total number of cases of a disease existing in a population divided by the total population. Hospitalizations are the numbers of cases resulting in hospitalization. This assessment is especially important with COVID-19 as medical resources has become overwhelmed by the prevalence of the disease. Morbidity is simply a term for a disease or illness, and co-morbidities denote other diseases or illnesses that occur simultaneously. Mortality refers to death, and mortality rate is the number of deaths due to a disease divided by the total population.

These data are reported in several ways. The CDC publishes COVID-19 data on its website. This includes total US incidence and prevalence rates as well as rates by state and local jurisdictions. The CDC also reports mortality rates, published weekly, in its epidemiological digest, *Mortality and Morbidity Weekly Report*. The digest was initiated

in 1930 and is an important resource for the management of diseases as well as a tool for ongoing research. Dates on prevalence, hospitalizations, mortality, and morbidity are also widely reported in the media, especially when an emerging disease has become an important part of the larger media agenda.

In the early stages of the pandemic, reliable disease data were limited to the number of positive cases and, as time wore on, deaths. Many local public health agencies were not prepared to handle the data collection requirements needed to effectively trace the spread of the disease. Officials from Wayne County, for example, were hampered in their attempts to trace the spread of the disease. The county executive issued a work-from-home order in the early days of the pandemic. This forced employees, especially public health epidemiologists, out of their offices where they had diminished or lost access to technology and resources. Epidemiologists had to rely on personal cell phones to make disease contact tracing calls, which showed up on patients' caller ID as either a private or unrecognized number and added to the difficulty in tracing this pandemic (C. Austerberry, personal communication, April 5, 2020). This added increased strain on an already taxed staff and made it more difficult to coordinate and follow up with important contact tracing and data collection.

Functions of Data

Data on incidence, prevalence, hospitalizations, mortality, and morbidity during crises including pandemics serve several functions (see Table 17.1). At its most general, data about the level of harm provide a global sense of the severity of a crisis. The number of people who are injured and sick and who die is among the most direct and enduring measure of the severity of a crisis. Such a measure also allow for the comparison of the harm among crises of various types and forms.

Lindell and Prater (2003) described three additional functions. Data allow community leaders and disaster managers to determine what resources would be necessary to respond to the crisis. During emerging infectious diseases, decisions about the

Table 17.1 Functions of disaster incidence, prevalence, hospitalization, mortality, and morbidity data.

Promoting and informing preparedness
Creating situational awareness
Informing decisions and response strategies
Personal protective behaviors
Deploying resources
Informing mitigation strategies
Measuring severity
Assessing risk
Personal
Organizational
Community
Determining impact on specific populations/locations
Informing communication strategies
Assessing effectiveness of communication strategies
Cultivating resilience
Informing policies

allocation of medical resources can be informed by prevalence data. In some instances, field hospitals have been quickly built to increase capacity for delivery of care and accommodate an anticipated surge of patients. Second, data about pandemics and their impacts can identify the specific populations who may be disproportionately impacted. Minority communities, low-income households, those living in long-term care facilities, and people with pre-existing conditions, for example, may be disproportionally impacted by some infectious diseases. The identification of specific vulnerabilities leads to specific protection and mitigation strategies. Third, data allow managers to model the impact of disease (Lindell & Prater, 2003). This is especially important in predictive modeling and epidemiological projections of disease rates. The National Academy of Science (2020) noted "[a]ccurate and timely information about mortality and significant morbidity related to the disaster are critical to supporting situational awareness for the disaster management enterprise and driving public health action to save lives and prevent further health impacts" (p. 2).

For Wayne County, which encompasses 43 separate cities and townships, providing accurate and timely COVID-19 data to local public officials in a usable form became a priority. County officials were hard-pressed to create a daily reporting of cases and deaths. Initially, that took the form of standard table listing the new and cumulative cases for each community (see Figure 17.1). This report began shortly after the governor of Michigan declared a state of emergency in mid-March 2020 and has continued daily since, providing key situational awareness for those charged with making their communities safer. As one community official put it, "[t]hese reports are essential to keeping my constituents informed. They allow us to see how we are doing and let us know if we need to take additional action. Please don't stop them" (K. Heise, personal communication, April 2, 2020).

Confirmed Covid-19 cases in Wayne County, MI (excluding Detroit City) reported on **04/24/2020 4:00PM**

Public Health

Report Date: **04/24/2020**
Novel Coronavirus Positive confirmed cases
Jurisdiction: Wayne County (excluding Detroit City)

Total number of confirmed cases for 04/24/2020: **168**
Total number of new deaths: **19**
Total cumulative cases: **6,926**
Total deaths as of 04/24/2020: **618**

Municipality	Cases Confirmed Today	Total Confirmed Cases	Deaths Today	Total Deaths
ALLEN PARK	6	168	0	17
BELLEVILLE	0	125	0	12
BROWNSTOWN TOWNSHIP	7	183	0	15
CANTON	2	419	1	28
DEARBORN	20	602	1	59
DEARBORN HEIGHTS	11	377	0	23
ECORSE	2	89	1	7
FLAT ROCK	1	59	0	1
GARDEN CITY	0	96	0	8
GIBRALTAR	0	12	0	1
GROSSE ILE	0	25	0	2
GROSSE POINTE CITY	0	28	0	1

Figure 17.1 Example of Wayne County's daily COVID-19 report to local officials. *Source:* Wayne County Public Health Division.

Situational awareness is the ability to identify, process, and interpret critical information about an incident as it evolves. Situational awareness allows disaster managers and decision-makers to understand what is happening in as close to real time as possible. It requires "continuous monitoring of relevant sources of information regarding actual incidents and developing hazards" (FEMA, 2011, p. 20). Real-time data are especially important and challenging during a crisis because they allow managers to make strategic adjustments in response. Real-time data also allow individuals, organizations, and communities to assess risks and may be important in encouraging risk avoidance strategies.

Moreover, awareness of morbidity and mortality is necessary to creating targeted and effective public health messages for purposes of prompting protective actions among targeted audiences (National Academy of Science, 2020, p. 4). Managers can direct messages and recommendations to specific audiences based on their individual vulnerabilities. Data can also help in assessing the effectiveness of public health messages in promoting recommended behavioral change.

As the pandemic expanded across the United States, Wayne County committed to producing daily COVID-19 reports and to post updated data on its website. The county created and maintained a searchable dashboard that allows the public to view the total number of cases and deaths by local community, as well as by race and age (Figure 17.2).

Data may also function to promote the development of community resilience (National Academy of Science, 2020). Resilience is the capacity to both avoid and bounce back from disruptions (O'Hair et al., 2010). Specific points of vulnerability, interventions, the development of response capacities, and necessary resources can be informed by mortality and morbidity data. Policy changes can target these issues in ways that promote the capacity to avoid and bounce back from disruptions. Longitudinal data on mortality and morbidity can also demonstrate progress on developing community resilience.

Accurate data on mortality and morbidity during a pandemic can provide the basis for prevention, mitigation and preparedness activities; inform specific decisions and strategies during a response; and drive changes in policy, practice, and behaviors.

Figure 17.2 Wayne County, Michigan COVID-19 dashboard. *Source:* www.WayneCounty.com.

Failure to accurately capture and report mortality and morbidity data accurately and consistently undercuts the capacity to protect the public (National Academy of Science, 2020).

Complexity in Reporting Incidence, Prevalence, Hospitalizations, Mortality, and Morbidity

Data about the impact of emerging infectious diseases serve many important functions, though collecting and reporting these data are complex and varied. Health officials rely on a variety of non-congruent systems to collect the data. Data must be collected in difficult circumstances, and it is subject to different and often conflicting interpretations. These systems and stakeholders face coordination and logistic challenges, lack of resources, competing demands, and short response times. The same incident can generate dramatically different estimates of mortality and morbidity depending on policies, practices, and personnel leading to very different assessments of harm, response strategies, and policy recommendations (National Academy of Science, 2020).

Accurate data collection during a crisis is often complicated by the conditions of the crisis. Disaster zones often are not easily accessed, and personnel may be overwhelmed with managing and responding to the crisis. In other cases, the disaster itself imposed limitations. Following Hurricane Maria's impact on Puerto Rico, for example, a breakdown in communication networks and the loss of electricity impeded data reporting (Andrade et al., 2020). In some cases, people die in circumstances where they cannot be immediately identified. Fires such as the Camp Fire in Paradise, California resulted in many fatalities that could not be immediately identified. Bodies had been badly burned, requiring investigation by forensic experts to identify human remains. In some cases, the exact cause of death may not be immediately identified. Post-mortem tests for infectious diseases, for example, are not routinely conducted. People who die from infectious disease in their homes or long-term care facilities are unlikely to be tested. Thus, deaths from infections such as seasonal influenza are likely underreported (Charu et al., 2011).

Given these factors, delays in reporting of vital statistics regarding mortality and morbidity typically occur. Dynes and Quarantelli (1972) noted: "In the absence of conditions which make the collection of accurate information possible and under the demand of the media and other sources for quick information, there is a tendency for various public officials to over-estimate the human and property costs" (p. 46). It is often several months before data are collected and collated so that credible estimates are released. In the intervening period, initial and often incorrect estimates of disaster impact have often been disseminated in the media.

One of the most persistent issues of mortality and morbidity reporting involves differing and divergent case definitions. A clear, common, and standardized case definition is critical to effective investigation of outbreaks. A case definition includes criteria for persons impacted, as well as place, time, and clinical features of case (CDC, 2020a). Essentially, the case definition determines what to count, that is, what to call a case given the criteria for particular disease, syndrome, or other health condition. Standardized case definitions ensure that cases are equivalent, allowing for more systematic and consistent data collection. Moreover, disease outbreaks can be tracked over time and by location (CDC, 2020b).

Many diseases that are well understood and part of national surveillance systems rely on standardized case definitions. Emergent diseases, however, may present challenges to creating standardized case definitions, especially early in an infectious disease outbreak. Uncertainty about origin, a limited number of cases, and data which have not been collated can delay the development of common and standardized case definitions.

In Wayne County, for example, difficulties in collecting and processing accurate COVID-19 data arose early in the pandemic and persisted. In Michigan, public health officials use the Michigan Disease Surveillance System (MDSS) to record and track infectious diseases. The system was created in 2003 and was designed to coordinate infectious disease cases to determine whether an outbreak had occurred (State of Michigan, 2020). As COVID-19 went from a handful of cases in early March 2020 to a full-blown pandemic a few weeks later, MDSS's limitations became more pronounced, especially with regard to collecting and tracking co-morbidities and other social determinants of health. As one public health official stated:

> By our estimation and analysis, nearly 30% of all Wayne County COVID-19 case data in the Michigan Disease Surveillance System (MDSS) lacks basic patient demographic information, including race and hospital name in many instances. That missing patient information hampers our efforts to effectively track and respond to the pandemic in our community. Presently, the county's public health staff are manually updating this information, but this is extremely labor-intensive and, despite our team's best efforts, may only partially address the problem of incomplete case data.
>
> *Source: C. Austerberry, personal communication, April 15, 2020.*
> *© 2020, C. Austerberry.*

In addition, clearly defined criteria for case definitions using a standardized approach facilitate communication with the public. Officials can more clearly describe what is being counted and reported at a particular point in time; the processes for counting, estimating, and projecting disease rates; and when more information will be provided (National Academy of Science, 2020). This process of communicating mortality and morbidity data may enhance public understanding and reduce confusion and rumors. Consistent and timely data-informed public messaging from credible sources also helps to avert the development of rumors and misinformation.

Excess Mortality and Morbidity

Public health epidemiologists also calculate excess mortality as a metric of the disease's progression. Unlike direct mortality, these are population estimates of total disaster-related mortality and morbidity based on calculating the mortalities and morbidities following a disaster or pandemic and comparing these to a base-rate observed in the same population for a period previous to the event (National Academy of Science, 2020, p. 47). They require that estimators make a variety of decisions about methods that may impact results. Principal among these are the decisions about the pre-event period for comparison and the post-event interval following the disaster. In essence, these estimates indicate how many deaths, injuries, or illnesses are

associated with the disaster or pandemic but not caused directly. Typically, these estimates are much higher than direct mortality and morbidity. Santos-Burgoa et al. (2018), for example, calculated excess mortality in Puerto Rico following the 2017 landfall of Hurricane Maria. Their analysis found that 2,975 excess deaths occurred during the six-month period following the hurricane. The official direct death toll reported for several months after the disaster remained at 64.

These estimates are different from direct reports of mortality and morbidity in important ways. First, they are estimates, and thus do not have the same level of precision. Excess mortality estimates, therefore, are subjects to critique based on the methods employed. In addition, estimates of excess mortality and morbidity can only occur after the disaster is resolved and usually take additional time. Estimates are complex and must account or a variety of factors, such as population migration and other risk factors that may have caused illness or death (Spiegel, Sheik, Woodruff, & Burnham, 2001). The fact that they are reported long after the disaster means that they are often contrasted with earlier reports of direct deaths. Finally, as illustrated in the case of Hurricane Maria, these excess mortality estimates are typically much higher than direct deaths (Andrade et al., 2020).

In Wayne County, public health officials noted the difficulty in pin-pointing a reliable mortality count. One public health official wrote, "[r]eported COVID-19 cases are likely underestimated because of incomplete detection of cases (i.e., lack of testing) and delays in case reporting" (J. Floyd, personal communication, May 15, 2020). The account was also limited because of ongoing COVID-19 case investigations and persons suspected of being infected but lacking a confirmed positive diagnosis.

Challenges in Reporting to the Media

As noted earlier, there is often significant media attention and interest in mortality and morbidity numbers, and this translates to pressure to provide data to the public as soon as possible (National Academy of Science, 2020, p. 46). Any perceived delay can be interpreted as lack of transparency. Data may sometimes be released as preliminary. Data are often reported as a standard part of post-crisis press conferences and within news releases. Media reports often carry running tallies of mortality and morbidity as a disaster develops over time. There are also significant reporting challenges based on the general chaos and confusion associated with a disaster.

Additional journalistic norms, practices, and media frames create reporting challenges. Journalism follows a traditional norm of objectivity that privileges official sources. Data provided by disaster managers, epidemiologists, and officials are likely to receive more weight in media accounts than other sources. In addition, journalism tends to bias statistics as hard facts, often without giving consideration of the underlying methods and data (Ahmad, 2016). The public often has limited capacity to understand the methods and assumptions associated with mortality and morbidity reporting. A variety of media frames for disaster may also influence reporting (Pan & Meng, 2016). These include health risks, social status, political/legal issues, prevention/health education, and medical/scientific frames. In addition, media reports sometimes include reports of specific individuals who have died. These may include notable individuals and celebrities as well as average people lost to a crisis or pandemic.

Communicating Mortality and Morbidity Data during COVID-19

The COVID-19 pandemic is the most severe and disruptive public health emergency since the 1918 Spanish Flu. Although calculations of mortality and morbidity at that time were even more difficult, the 1918 pandemic likely infected as many as 500 million people worldwide and caused around 50 million deaths (Barry, 2020). CDC modeling of COVID-19 mortality has projected a worst-case scenario for US deaths as high as 2.4 million with as many as 21 million infections (Fink, 2020, March 13). Interventions such as testing, contact tracing, limitations on mass gatherings, and reductions in travel would limit deaths. A similar study in Great Britain concluded that without these kinds of intervention, the pandemic could result in 2.2 million deaths in the United States (Elsland & O'Hare, 2020, March 17).

The US response to COVID-19 is marked by delayed action, a politicized debate about the veracity and effectiveness surrounding the emerging epidemiological science and inaccurate data on incidence, prevalence, hospitalizations, mortality, and morbidity (Haffajee & Mello, 2020; Young, 2020, August 4). Data have been collected and reported in changing and inconsistent ways leading to accusations of political interference designed to hide the true scope of the harm (Diamond & Cancryn, 2020, July 15).

In July 2020, for example, officials from the Trump Administration changed the long-standing procedures and method used for reporting data through the CDC (Halpren, 2020, July 16). The shift required hospitals to report COVID-19 data to the US Department of Health and Human Services (HHS), placing an increased burden on the already taxed hospitals and leading some to suggest it was a "federal coverup of important data during a national health emergency" (The San Diego Union Tribune, 2020, July 16). In response to the change, the president of the American Medical Association, Susan R. Bailey, wrote "[W]e urge and expect that the scientists at the CDC will continue to have timely, comprehensive access to data critical to inform response efforts" (Sun & Goldstein, 2020).

As described earlier, the process of collecting, collating, and reporting data is vested in the CDC and employs the NNDSS and the National Healthcare Safety Network. The change in procedures for reporting of COVID-19 data was explained as an effort to streamline the process. Under the new procedures, data were to be reported by hospitals directly, or in some cases, through states agencies, to a private company, TeleTracking, which then coordinated data release to various agencies and the public (Heidt, 2020, July). The shift created significant confusion, however, as hospitals and state and local health departments struggled to accommodate the change.

The Trump administration, though a spokesperson at HHS, explained the change:

> Today, the CDC still has at least a week lag in reporting hospital data. America requires it in real time. The new, faster, and complete data system is what our nation needs to defeat the coronavirus, and the CDC, an operating division of HHS, will certainly participate in this streamlined all-of-government response. They will simply no longer control it.
>
> *(Stoltberg, 2020, July)*

A month later, other officials involved in the COVID-19 response described yet another data reporting system that would move reporting back under the central authority of the CDC (Mascarenhas, 2020, August).

In addition to changes in the centralization of data reporting, individual states instituted requirements and limitations on reporting of COVID-19 data. Principally among these was Florida. In late April of 2020, Florida was experiencing a significant spike in COVID-19 cases. State officials had placed few limitations on gatherings, had precluded municipal governments from doing so, and had not issued a mask mandate and was moving to reopen quickly. The state official charged with managing Florida's data was removed from her position (Lemongello & Theisen, 2020, May). At about the same time, state officials began withholding data and precluding medical examiners from releasing data on cause of death. These decisions were justified on the grounds that there were inconsistencies in the data and in an effort to protect privacy. Florida used similar arguments to justify withholding data about school infection rates (Moreno, 2020, September).

Other states adopted similar strategies. Texas chose not to report mortality data for nursing homes and long-term care facilities (Walters & Astudillo, 2020, April). Georgia reported COVID-19 data in a way that erroneously created the impression of a downward trend in infections. Data were reported by days of the week, but the days were listed out of order. The error was blamed on an outside company (Mariano & Trubey, 2020, May). Additional confusion was created when many states conflated viral and antibody tests creating the impressions of more testing than was actually occurring. The CDC similarly mixed these testing numbers exacerbating the problem (Madrigal & Meyer, 2020, May). An additional factor in reporting COVID-19 data involved the role of underlying health conditions or co-morbidities. Several studies have suggested that a significant proportion of those who die from COVID-19 have underlying health conditions. These include cancer, chronic kidney disease, chronic obstructive pulmonary disease, immunocompromised, obesity, heart conditions, and diabetes. Additionally, age is a factor, and COVID-19 has a disproportional impact on the African American community, in some part due to underlying health conditions (Yancy, 2020). The role of co-morbidities and health disparities in mortality from infectious diseases is well established and not unique to COVID-19. In September 2020, the CDC reported data showing that only about 6% of the people who had died of COVID-19 did not have co-morbidities. Stated another way, some 94% of the reported deaths listed both COVID-19 and additional underlying health conditions. The 6% statistic was used to argue that the disease was much less virulent than had been suggested. "Only 6%" became a viral meme, trending on the Twitter platform and retreated by others, including President Trump. The data used to make the "only 6%" claim were based on the cause(s) of deaths listed on death certificates. The claim sought to narrow the case definition of a COVID-19 death in ways that skewed the numbers. The claim that COVID-19 was much less serious than had been reported by the media was quickly disputed by medical experts, including Dr. Anthony Fauci, the United States' top infectious disease official, who stated unequivocally that coronavirus deaths in the United States are "real deaths from COVID-19" (Heidt, 2020, September 1). A third factor concerning COVID-19 data relates to testing rates and incidence of positive tests. Testing for COVID-19 has been described as one of the most important strategies for creating situational awareness. Testing informs strategies, allows for contact

tracings, and can determine when best implement or relax social distancing strategies. Essentially, testing gives epidemiologists critical situational awareness and allows them to track the status of a disease. Some officials, including President Trump, suggested that more testing results in more cases and therefore creates the impression that the outbreak is worse. In press conferences and in social media posts, President Trump has argued, "When you test, you create cases," and testing "makes us look bad" (Begley, 2020, July). Studies have shown that testing is a measure of the incidence rate and not a factor in creating more cases (Begley, 2020, July).

Discussion

Accurate COVID-19 data on incidence, prevalence, hospitalizations, and most especially mortality and morbidity are critical to the management of the pandemic, serving a variety of critical functions (Resolve to save lives, 2020). Data create situational awareness, inform strategic decision, and facilitate public participation in community mitigation strategies. In a more general sense, data address one of the most fundamental conditions of the pandemic: high levels of uncertainty about the level of threat and effective responses. While the volume of COVID-19 data is overwhelming, the need for credible data still outstrips supply. Failures to compile the data, provide context, and presenting it in standardized and consistent ways create misleading and flawed interpretations (Resolve to save lives, 2020). Conflicting data, arguments about what is counted and why, as well as efforts to withhold some data from the public create more uncertainty and confusion and undermine the effectiveness of response strategies. Moreover, the absence of accurate and transparent data systems undermines the ability of officials to implement effective communication strategies.

Data on testing, for example, is a measure of disease prevalence and the level of community spread at a particular point in time. These metrics typically would inform decisions about the recommended level of social distancing within a community, including the opening of restaurants, bars, and face-to-face learning in K-12 and university contexts. Contact tracing aids in identifying epidemiological and hospitalization trends during a pandemic. Mitigation strategies, therefore, have been compromised by the lack of accurate data. Reporting essential COVID-19 data using consistent metrics that allow for comparison across regions and over time is necessary for effective management. Data that are communicated effectively allow individuals and communities to both understand and reduce their risk (Resolve to save lives, 2020).

Morbidity and mortality data also can be significant in efforts to create persuasive appeals for the public to comply with mask wearing and social distancing by demonstrating the risk factor. This includes the general mortality rate for the population, as well as more targeted state-level and community-level mortality. Individuals may be more willing to comply with public health recommendations when there are credible data that morbidity and mortality rates are high. Those efforts to parse mortality data based on those who did or did not have underlying co-morbidities may create the impression that the risk is low and mitigation is unnecessary. One debate and source of confusion, for example, has been the mortality and morbidity rates for children and young adults. Data suggesting that children have a lower rate of mortality and morbidity have been used to support arguments that schools should open.

In addition to influencing public perceptions of risk, and public acceptance and compliance with mitigation strategies, the lack of consistent, standardized approaches has undermined credibility of public health agencies and messages. While the CDC has been considered the premier public health agency in the country, its response to COVID-19 has undermined the agency's credibility. Critics have pointed to inconsistent messages, statements that do not align with basic principles of public health and disease management, and the perception that data have been manipulated to align with administration narratives (Edwards, 2020). Others have charged that the CDC has been censored by administration officials seeking to ensure that data are consistent with larger political narratives about the pandemic (Sun, Abutaleb, & Bernstein, 2020, September). While the CDC has historically been the central source of public health messages, it has now taken a position behind other agencies and administration spokespersons. Honesty and transparency about the effectiveness of control measures as measured by such factors as prevalence, morbidity, and mortality promote accountability and motivate continued improvement (Resolve to save lives, 2020).

Conclusion

Several conclusions can be drawn about the communication of data regarding the incidence, prevalence, hospitalizations, mortality, and morbidity of COVID-19. First, the confusion and disruption of COVID-19 data collection and communication systems has both undermined the response and illustrated the importance of data and communication in response to a pandemic. Public compliance with mitigation recommendations such as wearing masks and social distancing has been inconsistent and often viewed as highly politicized. The failure to promote compliance with mitigation strategies has contributed to morbidity and mortality. Effective communication, drawing on credible data from standardized systems, is necessary to inform and persuade the public.

Second, this analysis illustrates that US systems for tracking and reporting important metrics such as incidence, prevalence, hospitalizations, mortality, and morbidity lack resilience and standardization (National Academy of Science, 2020; Resolve to save lives, 2020). The systems employed by the states and local health authorities were overwhelmed by the scope of the disease and the general chaos and disruption that occurred, lacked the necessary expertise, and used varying methods. Data were collected and reported in different ways, and in some instances, using different definitions. Several reports have called for a more consistent system, using national standards (National Academy of Sciences, 2020; Resolve to save lives, 2020). These include standardized measures, clearer timelines for reporting, and consistent methods and standards for communicating data. These standards should go beyond merely reporting data to include discussions of methods for collecting, providing a context for interpreting and methods for disseminating to the media and the public.

Third, this discussion illustrates that data about an infectious disease such as COVID-19 may be manipulated and censored to be consistent with other narratives. These may include political narratives. The lack of accurate data and interpretations informed by science and public health practice may lead to misunderstanding, a reduced ability to manage the event, failures to comply with recommendations, and

significantly enhanced harm. Manipulation and censorship damage the credibility of sources in ways that undermine the larger capacity to manage outbreaks. The loss of credibility in official sources and trust in data will likely have long-term implications for health, risk, and crisis communication. A public health communication system built on networks of centralized expertise from federal agencies creating messages that are disseminated to public health partners may no longer be an effective strategy.

Finally, communicators and emergency managers must continually factor in the need to build and maintain credibility while delivering simplified and consistent messages during a crisis and simplify and target self-efficacy messages. In addition to following the established best practices for crisis communication (Reynolds & Seeger, 2005; Seeger, 2006), communication practitioners must endeavor to understand how diverse communities and publics respond differently to the same information. In addressing the diverse information uses, needs, and messages from these communities, communicators play a critical role in establishing the credibility with a community, which is necessary whenever a crisis occurs. This review suggests that collecting and communicating data on incidence, prevalence, hospitalizations, mortality, and morbidity are critical. The process is also fraught with pitfalls that may erode credibility, impede strategic response, and reduce compliance with public health recommendations.

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